気象庁海洋月報

Monthly Ocean Report

February 1997 (No. 50)

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Climate and Marine Department
Japan Meteorological Agency

気象庁 気候・海洋気象部

平成9年2月

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本月報に関する問い合わせは、

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表紙は、1997年２月の太平洋の月平均海面水温偏差図です。

陰影部は、平年より高温の海域を示しています。

The figure on the front cover shows the monthly mean SST anomalies for February 1997 in the Pacific Ocean.

Areas of positive anomalies are shaded.

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海況の特徴（１９９７年２月）

日本近海の海況

日本近海は、房総半島沖から紀伊半島にかけて平年より0.5℃以上低かったのを除いて、平年より高かった。特に、青森・秋田県沖と、三陸沖では平年より１℃以上高かった（第４図）。

黒潮は、上旬には九州から紀伊半島にかけて接岸して流れていたが、中旬に九州南東方に小蛇行が発生して九州南東で離岸した後、四国から紀伊半島にかけては接岸する流路をとっていた（第9図）。

本州東方の親潮系の冷水は、沿岸寄りの分枝は40.4゜N,142.3゜Eまで、沖合の分枝は39.3゜N,147.3゜Eまで、それぞれ達していた。
（第5図）。

太平洋の海況

太平洋赤道域では、160゜Eから170゜Eで、平年より0.5℃以上高かった。一方、日付変更線以東では平年より低かったが、南米沿岸では正偏差に転じた。

20～40゜Nの中部太平洋の負偏差域は、前月より小さくなり、平年より0.5℃以上低い海域は、170゜Wから150゜Wに限られた。アラスカ湾を除く45゜N以北では平年より0.5℃以上高く、30～40゜Nの140゜W以東では平年より1℃以上高かった。（第16図）。

Highlights February 1997

Seas adjacent to Japan

SSTs were generally above normal in the seas around Japan except along the coast from the Boso Peninsula to the Kii Peninsula. In particular, positive SST anomalies more than 1°C were observed around 40°N, 140°E in the Japan Sea and off Sanriku (Fig. 4).

The Kuroshio flowed along the coast of Kyushu and the Kii Peninsula in the first 10 days of the month. Because a small meander appeared south east of Kyushu in the second 10 days of the month, the Kuroshio flowed off the west coast of Kyushu and along the coast of Shikoku in the second and the third 10 days. East of the Kii Peninsula, the Kuroshio took almost the same path throughout the month. It went eastward from the Kii Peninsula. After passing around Hachijo Island, it flowed eastward along 33.5°N (Fig. 9).

Coastal and off-coastal branches of the Oyashio cold water extended southward to 40.4°N, 142.3°E and 39.3°N, 147.3°E, respectively (Fig. 5).

Pacific

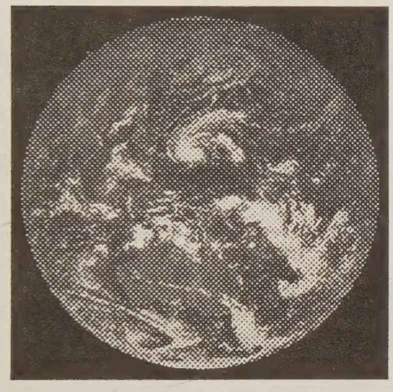
In the equatorial Pacific, positive SST anomalies more than 0.5°C were observed from 160°E to 170°E. East of the date line, SSTs continued to be below normal except off the coast of South America, where SST anomalies turned positive.

In the middle latitude of the Pacific, areas with negative SST anomalies less than -0.5°C between 20°N and 40°N were limited to 170°W and 150°W. SSTs were more than 0.5°C above normal north of 45°N except off Alaska Bay. Positive SST anomalies more than 1°C were observed from 30°N to 40°N east of 140°W (Fig. 16).

凌風丸による1997年1/2月の137°E線に沿った水温構造
Water temperature along 137°E on board the R/V Ryofu Maru in January/February, 1997

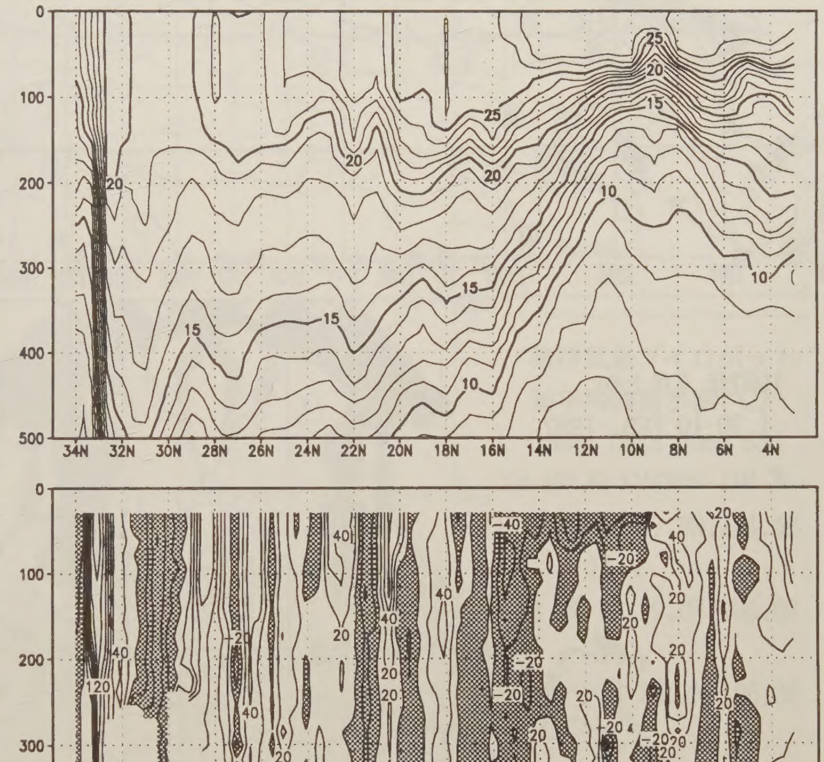
気象庁の観測船「凌風丸」が、1997年1月24日から2月1日にかけて137°Eに沿って行った海洋観測結果によると、16°N以南では平年に比べ水温躍層が上昇し、深さ100–150mを中心に水温は強い負偏差を示していた。9°N付近の100m以浅では周辺よりも躍層が盛り上がり、表層海流計による流れの分布からも冷水渦の存在を示しているが、これは1996年12月末にこの海域で発達した熱帯低気圧によって生じたと考えられる。

The R/V Ryofu Maru of JMA performed oceanographic observations along the meridian of 137°E from January 24 to February 1, 1997. Negative subsurface temperature anomalies were found south of 16°N in accordance with the thermocline which was shallower than long term mean. The thermocline depth in 9°N was the shallowest around the region and it should be related with the tropical cyclone that developed east of the Philippines in the end of December, 1996.



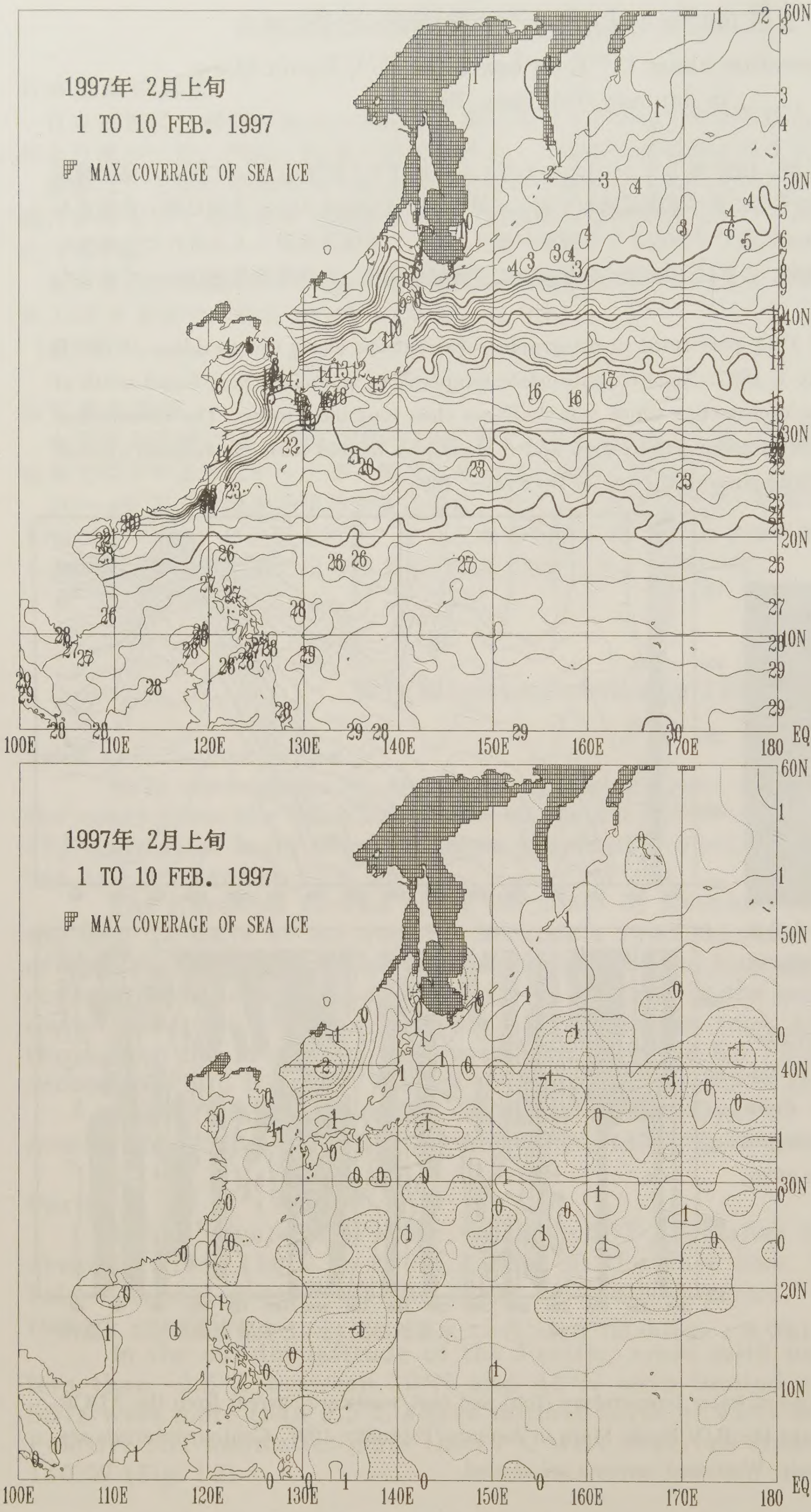
図B. 1996年12月26日の全球雲画像 (気象衛星観測月報 1996年12月号より転載)

Fig.B. Cloud Image of December 26,1996. The center of the figure indicates 0°N, 140°E. From *Monthly Report of Meteorological Satellite Center, December 1996.*



図A. 凌風丸の観測による1997年1～2月の137°E線に沿った水温断面図 (上) と表層海流計による流れの東西成分 (下)。

Fig. A. Depth-latitude sections of water temperature (top) and east/westward current from the ADCP (bottom) along 137°E on board the R/V Ryofu Maru in January/February, 1997. Contour intervals are 1°C and 20cm/sec, respectively. Westward currents are shaded.



旬平均沿岸水温(℃)
Coastal Water Temperature

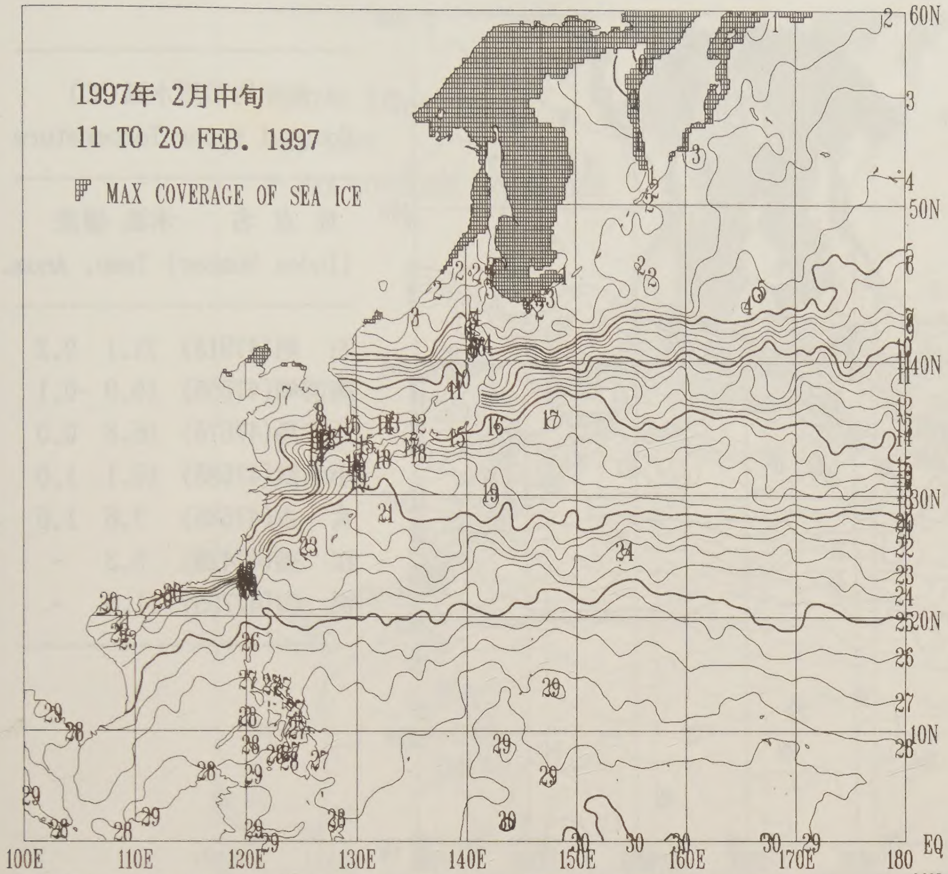
地点名 (Index Number)	水温 Temp.	偏差 Anom.
石垣(47918)	21.6	1.3
御前崎(47655)	10.7	0.2
八丈島(47678)	17.9	1.2
小名浜(47598)	10.1	0.4
宮古(47585)	8.5	1.1
江差(47428)	8.0	-
浜田(47755)	11.4	-

海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	12.4
四国沖	29.0N,135.0E	19.4
東シナ海	28.2N,126.3E	21.3

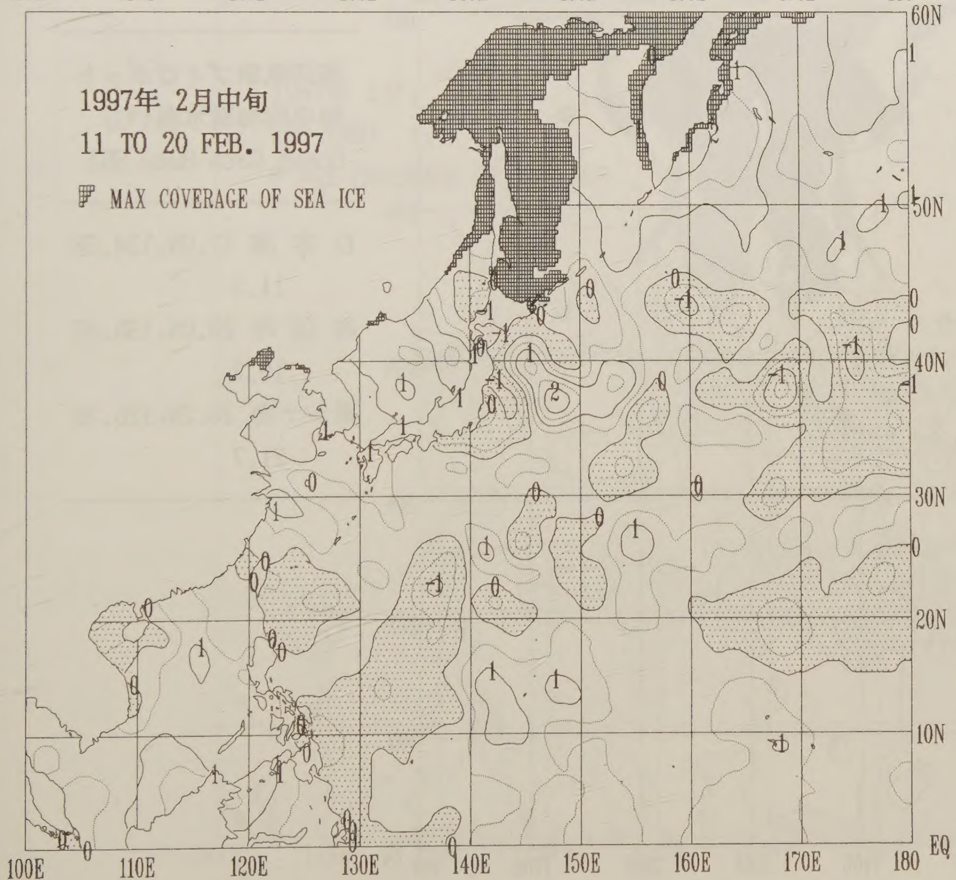
第1図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1997年 2月上旬)

Fig.1 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 1st ten-day period in FEB 1997. Anomalies are computed from the JMA climatology (1961-90). Contour interval is 1°C and additional anomaly contours of 0.5°C are shown as broken lines. Negative anomalies are spotted.



旬平均沿岸水温(℃)
Coastal Water Temperature

地点名 (Index Number)	水温 Temp.	偏差 Anom.
石　垣(47918)	20.7	-0.1
御前崎(47655)	10.8	0.1
八丈島(47678)	16.3	-0.6
小名浜(47598)	10.4	0.8
宮　古(47585)	8.2	1.4
江　差(47428)	6.0	-
浜　田(47755)	11.2	-

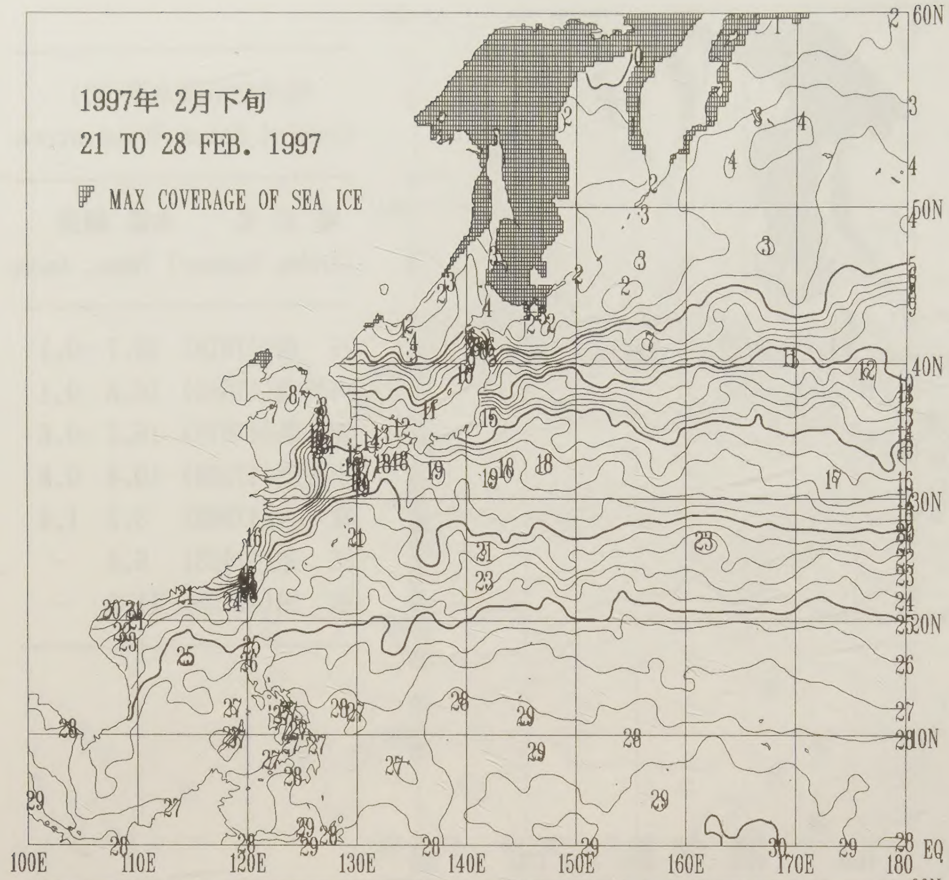


海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海 37.9N,134.5E	11.4
四国沖 29.0N,135.0E	19.1
東シナ海 28.2N,126.3E	21.2

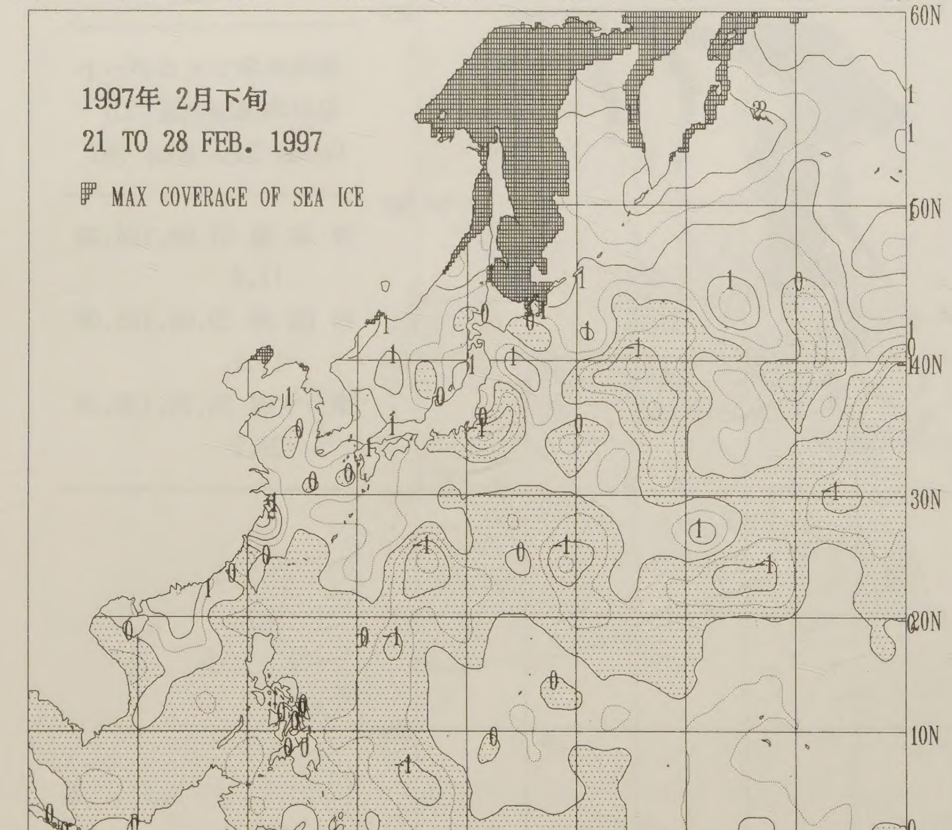
第2図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1997年 2月中旬)

Fig.2 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 2nd ten-day period in FEB 1997. Anomalies are computed from the JMA climatology (1961-90). Contour interval is 1°C and additional anomaly contours of 0.5°C are shown as broken lines. Negative anomalies are spotted.



旬平均沿岸水温(℃)
Coastal Water Temperature

地点名 (Index Number)	水温 Temp.	偏差 Anom.
石　垣(47918)	21.1	0.2
御前崎(47655)	10.9	-0.1
八丈島(47678)	16.8	0.0
小名浜(47598)	10.1	1.0
宮　古(47585)	7.6	1.6
江　差(47428)	5.3	-
浜　田(47755)	11.6	-

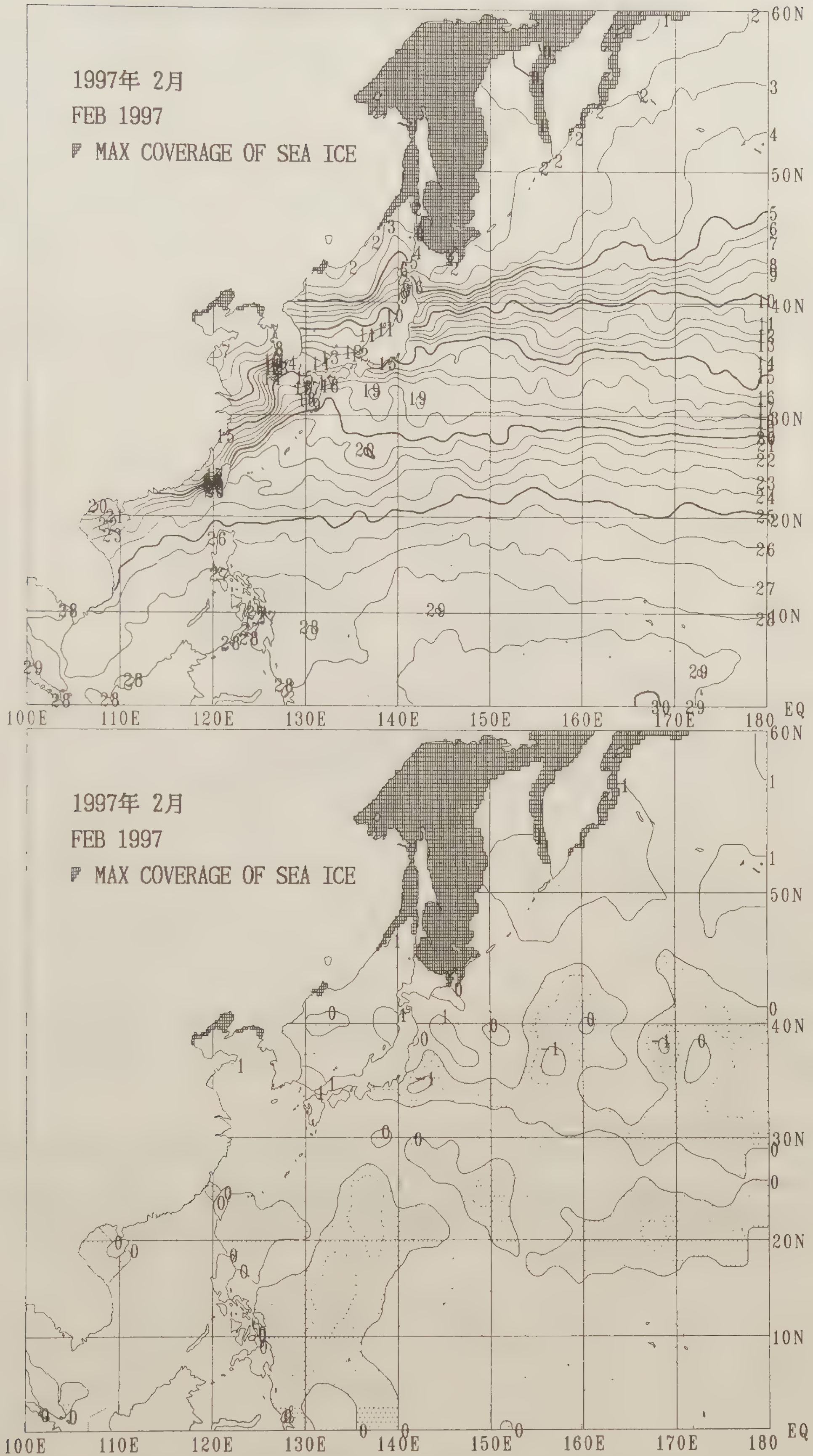


海洋気象ブイロボット
旬平均海面水温(℃)
Ocean Data Buoy SST

日本海	37.9N,134.5E	11.5
四国沖	29.0N,135.0E	19.2
東シナ海	28.2N,126.3E	21.7

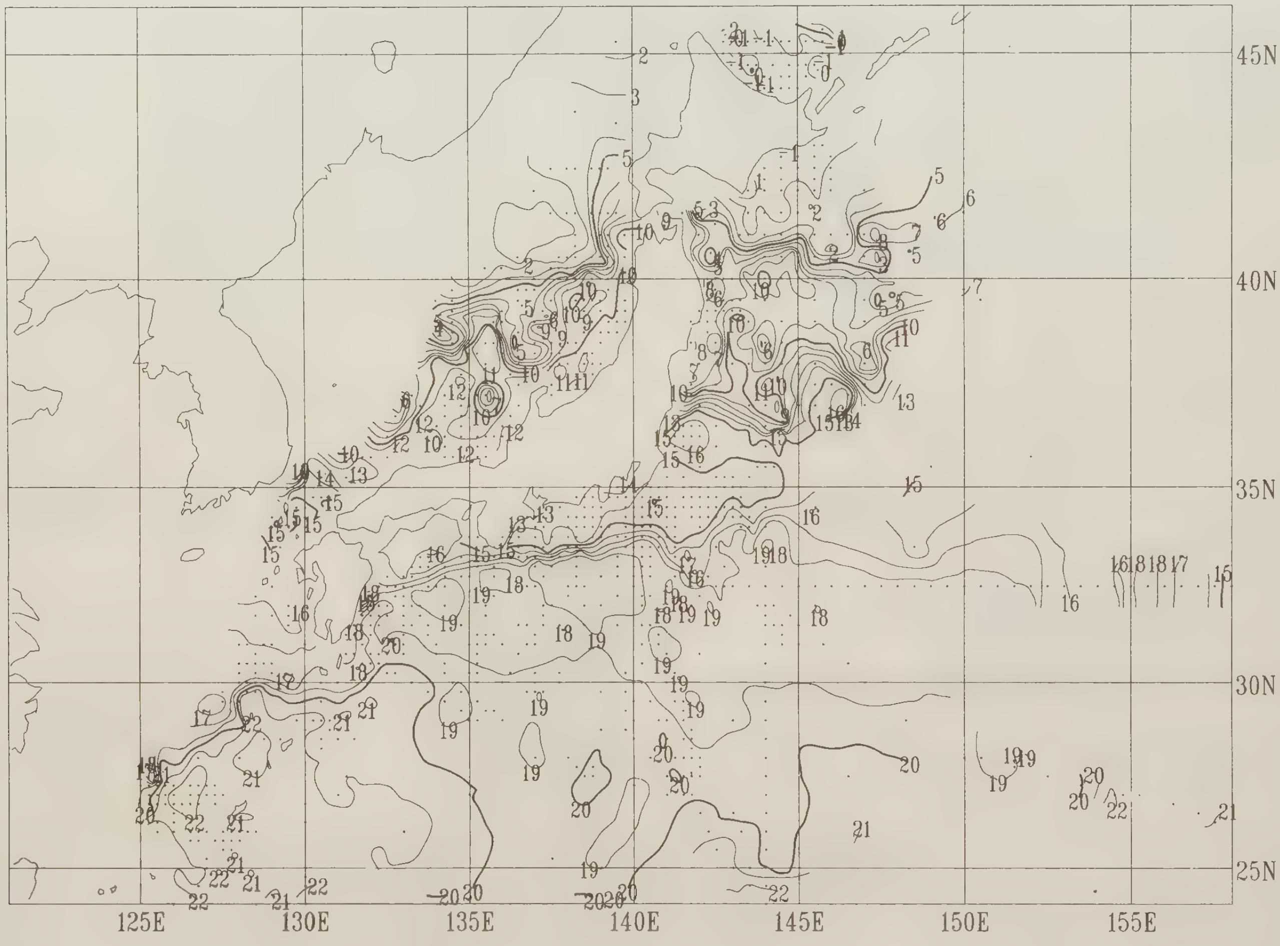
第3図 北西太平洋旬平均海面水温図(上)及び偏差図(下)(1997年 2月下旬)

Fig.3 Ten-day mean SSTs in the western North Pacific (top) and anomalies (bottom) for the 3rd ten-day period in FEB 1997. Anomalies are computed from the JMA climatology (1961-90). Contour interval is 1°C and additional anomaly contours of 0.5°C are shown as broken lines. Negative anomalies are spotted.



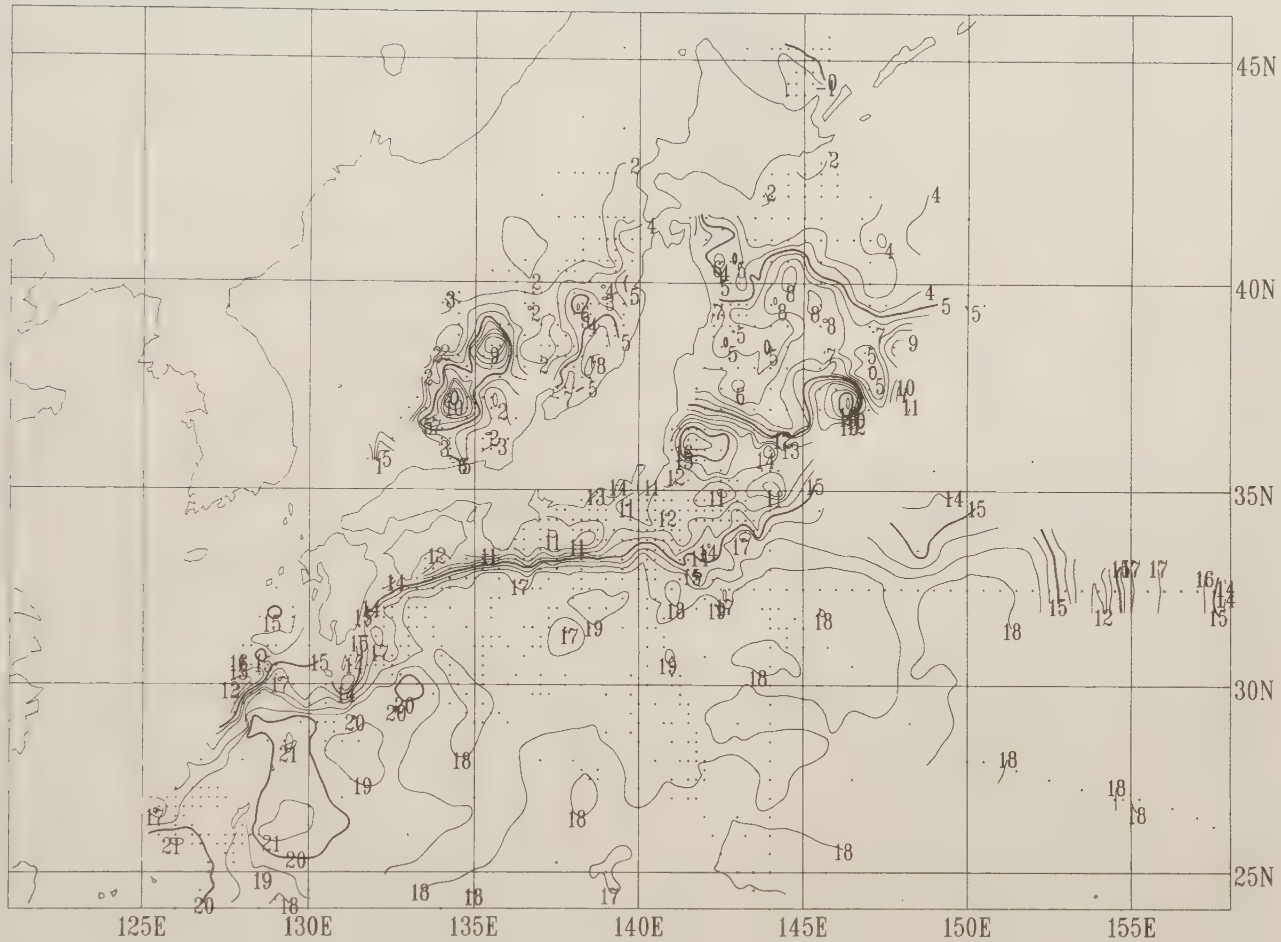
第4図 北西太平洋月平均海面水温図(上)及び偏差図(下)(1997年 2月)

Fig.4 Monthly mean SSTs in the western North Pacific (top) and anomalies (bottom) for FEB 1997. Anomalies are computed from the JMA climatology (1961-1990). Contour interval is 1°C and additional anomaly contours of 0.5°C are shown as broken lines. Negative anomalies are spotted.



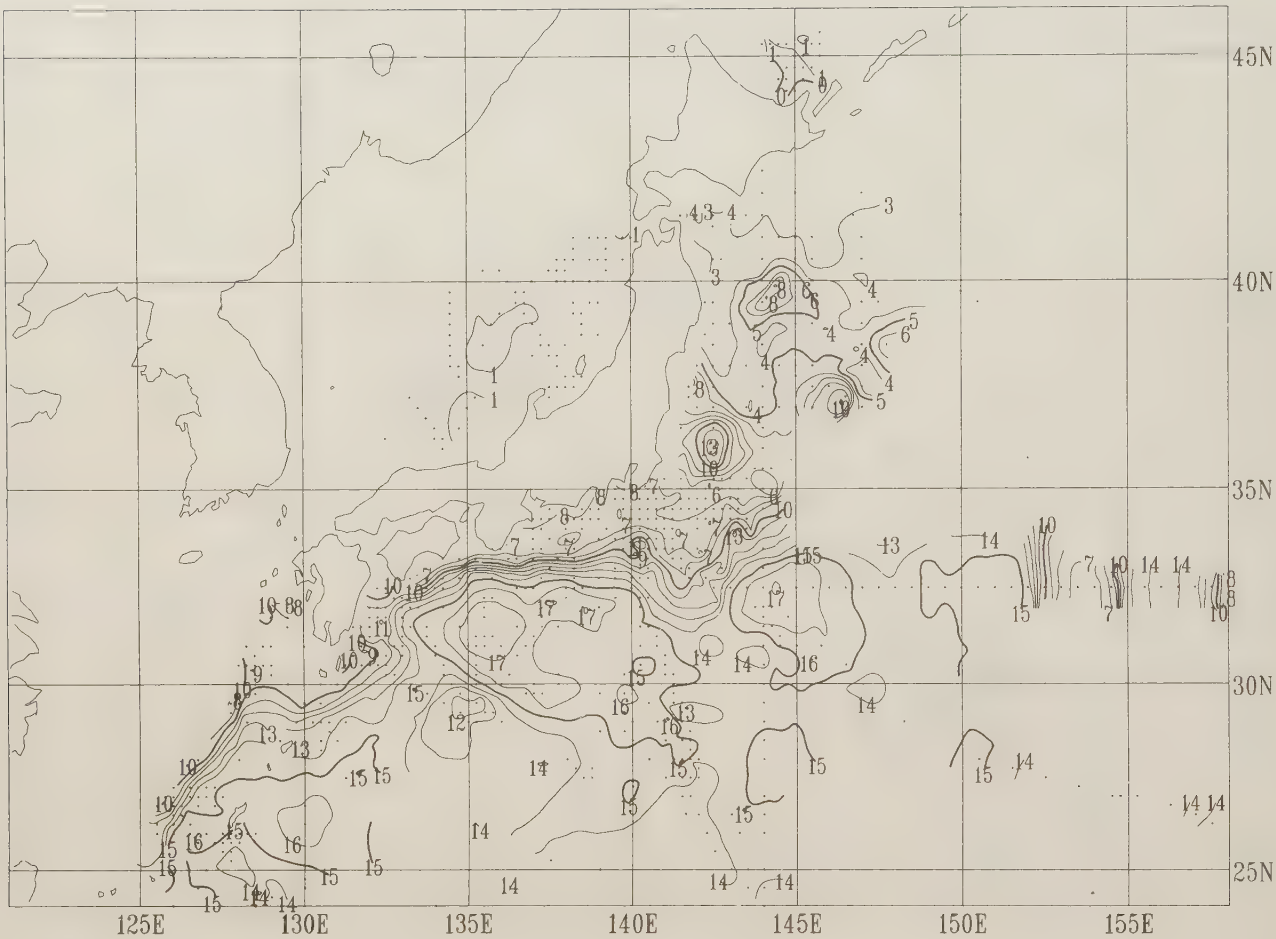
第5図　日本近海表層水温(深さ100m)図 (1997年 2月)

Fig.5 Subsurface (100m) temperatures in the seas adjacent to Japan for FEB 1997. Contour interval is 1°C. Observation points are denoted by dots.



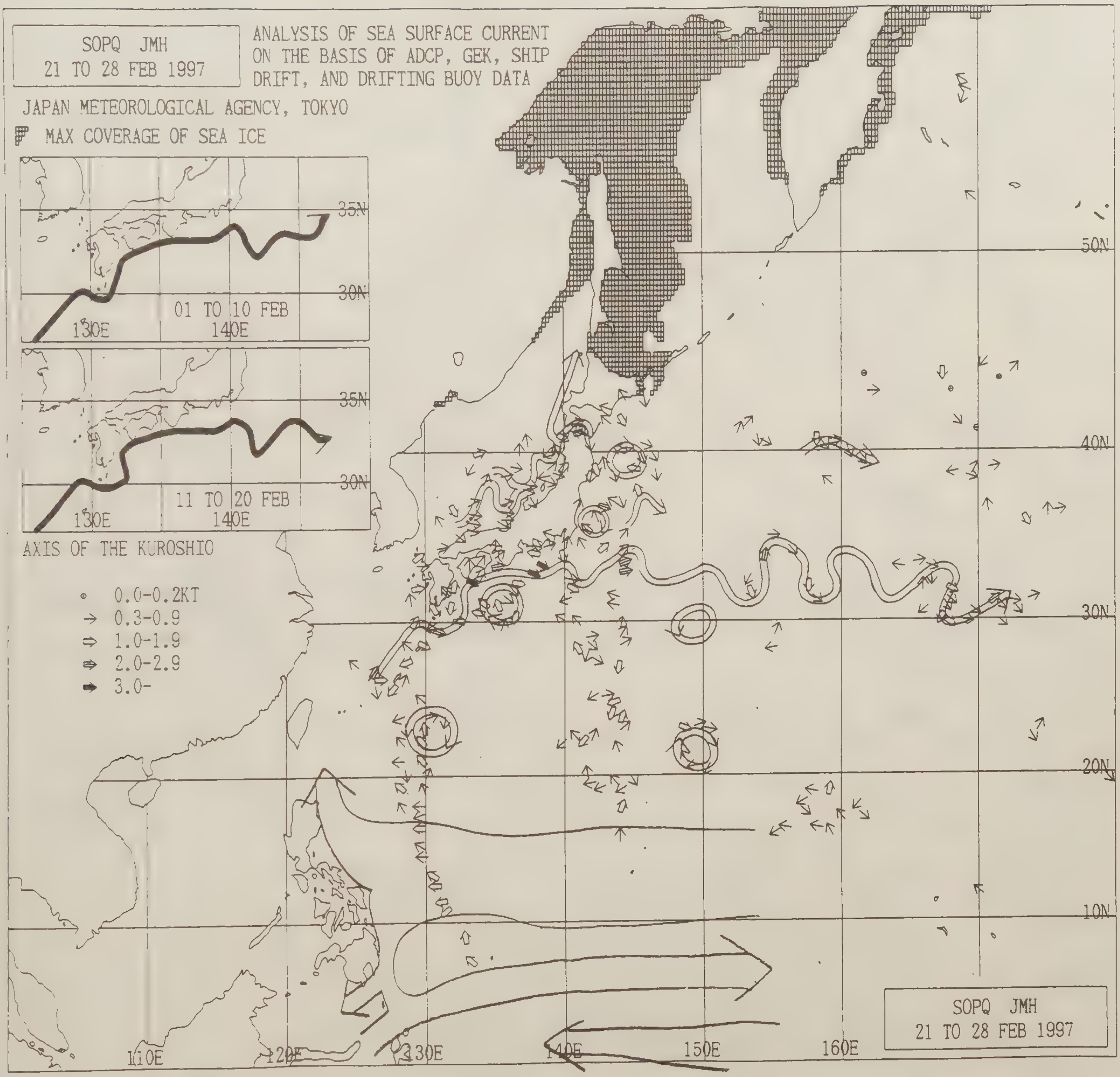
第6図　日本近海表層水温(深さ200m)図 (1997年 2月)

Fig.6 Subsurface (200m) temperatures in the seas adjacent to Japan for FEB 1997. Contour interval is 1°C. Observation points are denoted by dots.



第7図　日本近海表層水温(深さ400m)図 (1997年 2月)

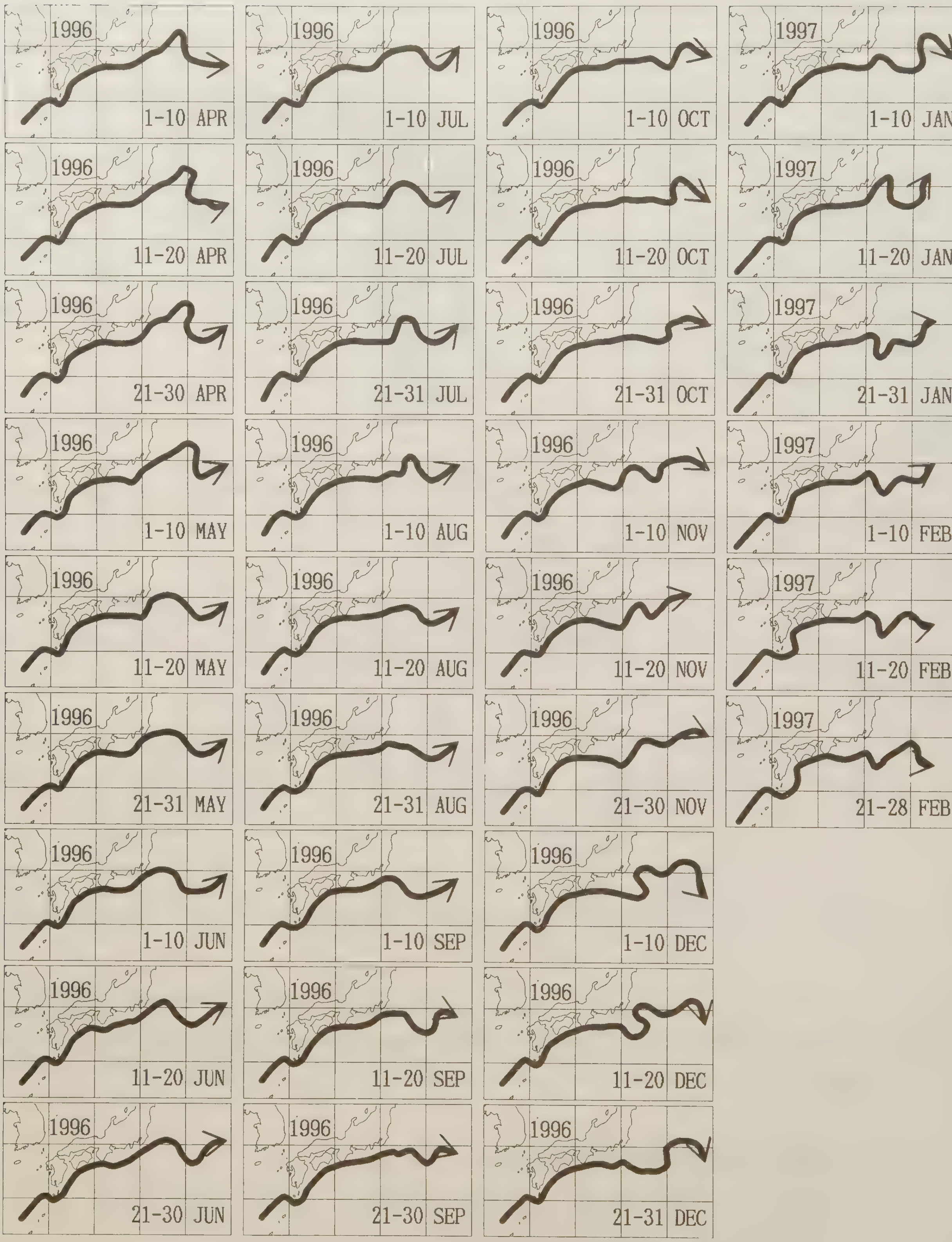
Fig.7 Subsurface (400m) temperatures in the seas adjacent to Japan for FEB 1997. Contour interval is 1°C. Observation points are denoted by dots.



第8図　北西太平洋海流図（1997年 2月下旬）

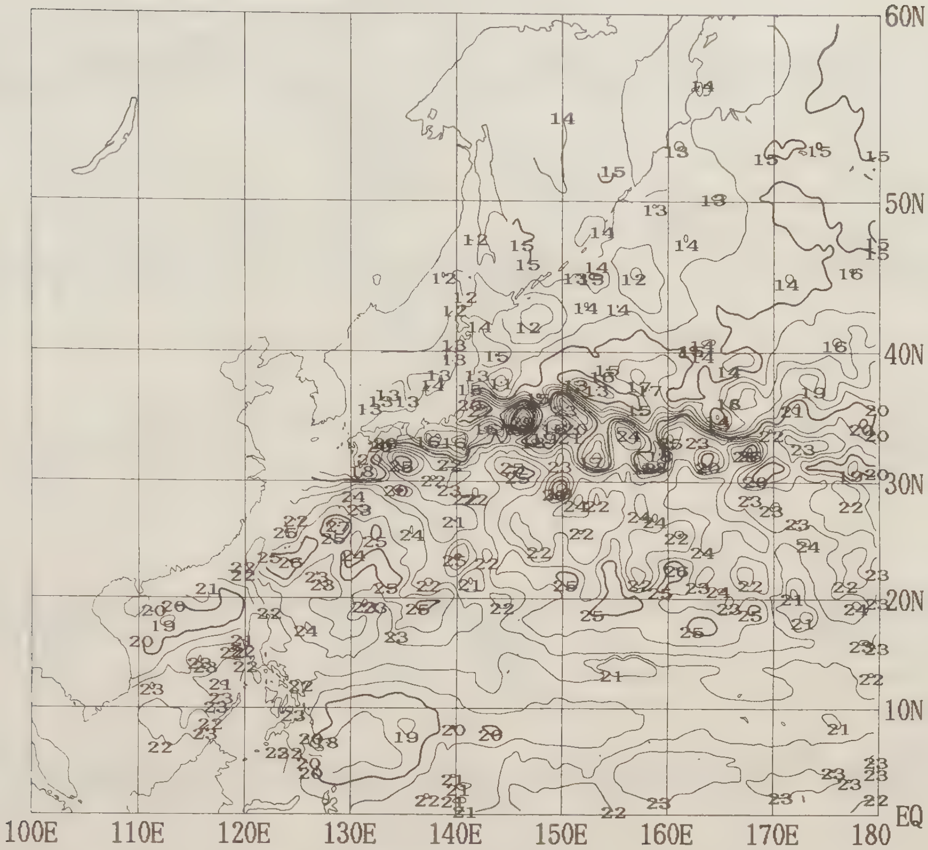
Fig.8 Analysis of the sea surface current in the western North Pacific for the 3rd ten-day period in FEB 1997. Small arrows indicate sea surface currents measured with acoustic Doppler current profilers, GEKs deployed in research vessels, and ship drift by merchant ships/drifting buoys during the month. Major currents such as the Kuroshio and the North Equatorial Current are denoted by larger open arrows.

Time series of the Kuroshio axis



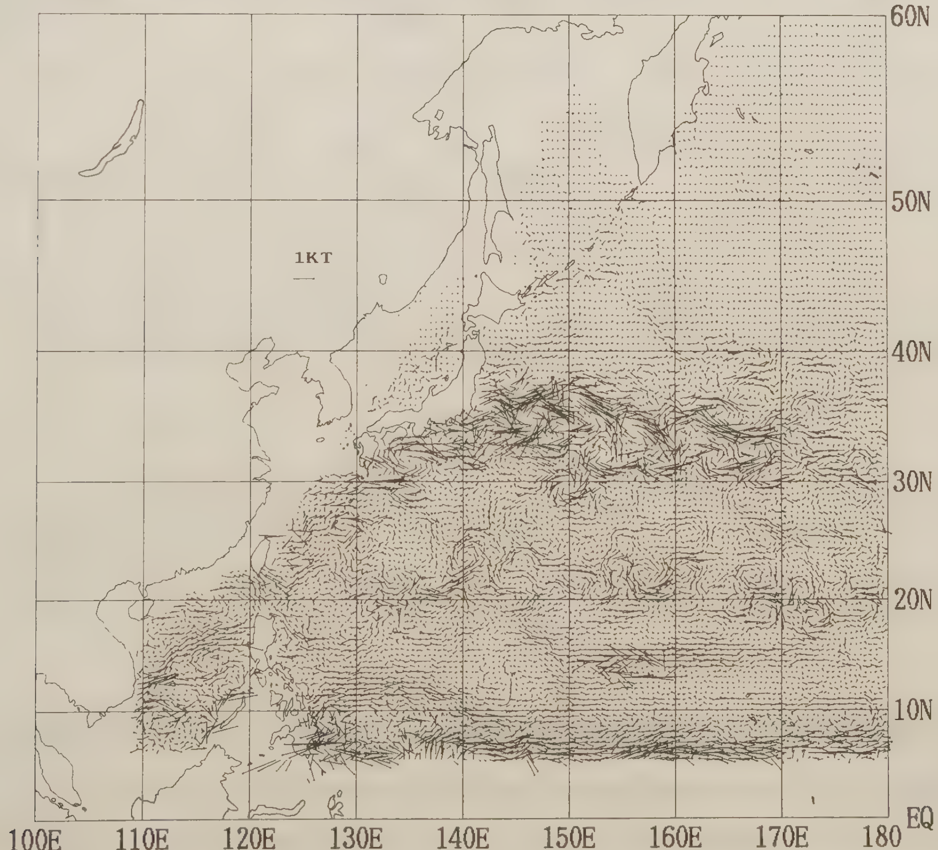
第9図 旬別黒潮流軸図

Fig.9 Time series of the Kuroshio axis



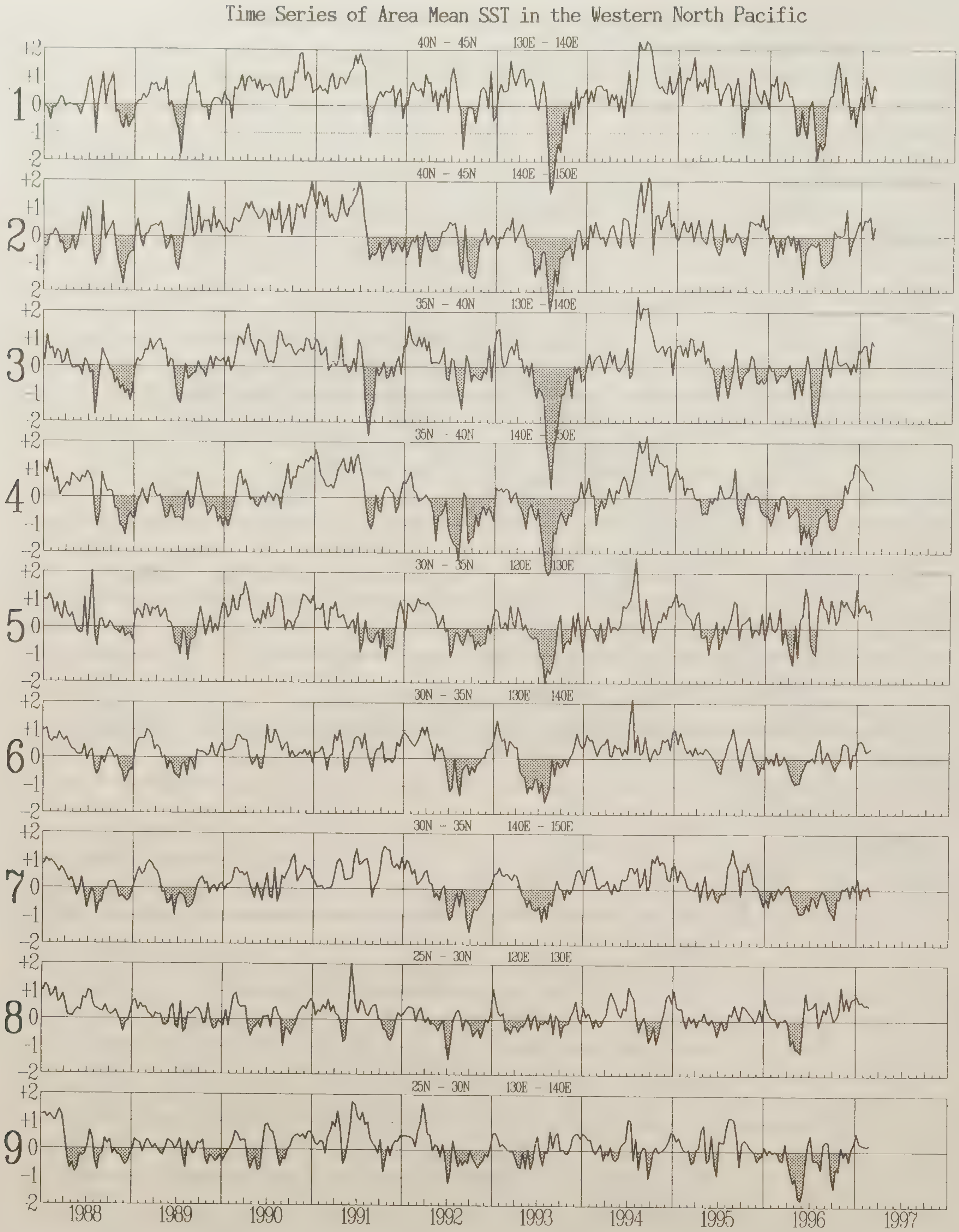
第10図 北西太平洋海面力学高度分布図(1997年 2月22日)

Fig.10 Sea surface dynamic heights (10cm) in the western North Pacific derived from the altimeter data of TOPEX/POSEIDON (FEB 22,1997).



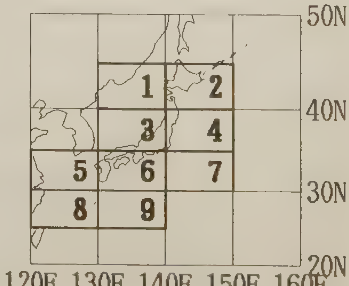
第11図 北西太平洋海流ベクトル図(1997年 2月22日)

Fig.11 Sea surface current vectors in the western North Pacific (FEB 22,1997). Vectors are derived from the sea surface dynamic heights from TOPEX/POSEIDON and sub-surface temperature distribution assuming the gostrophic relation.

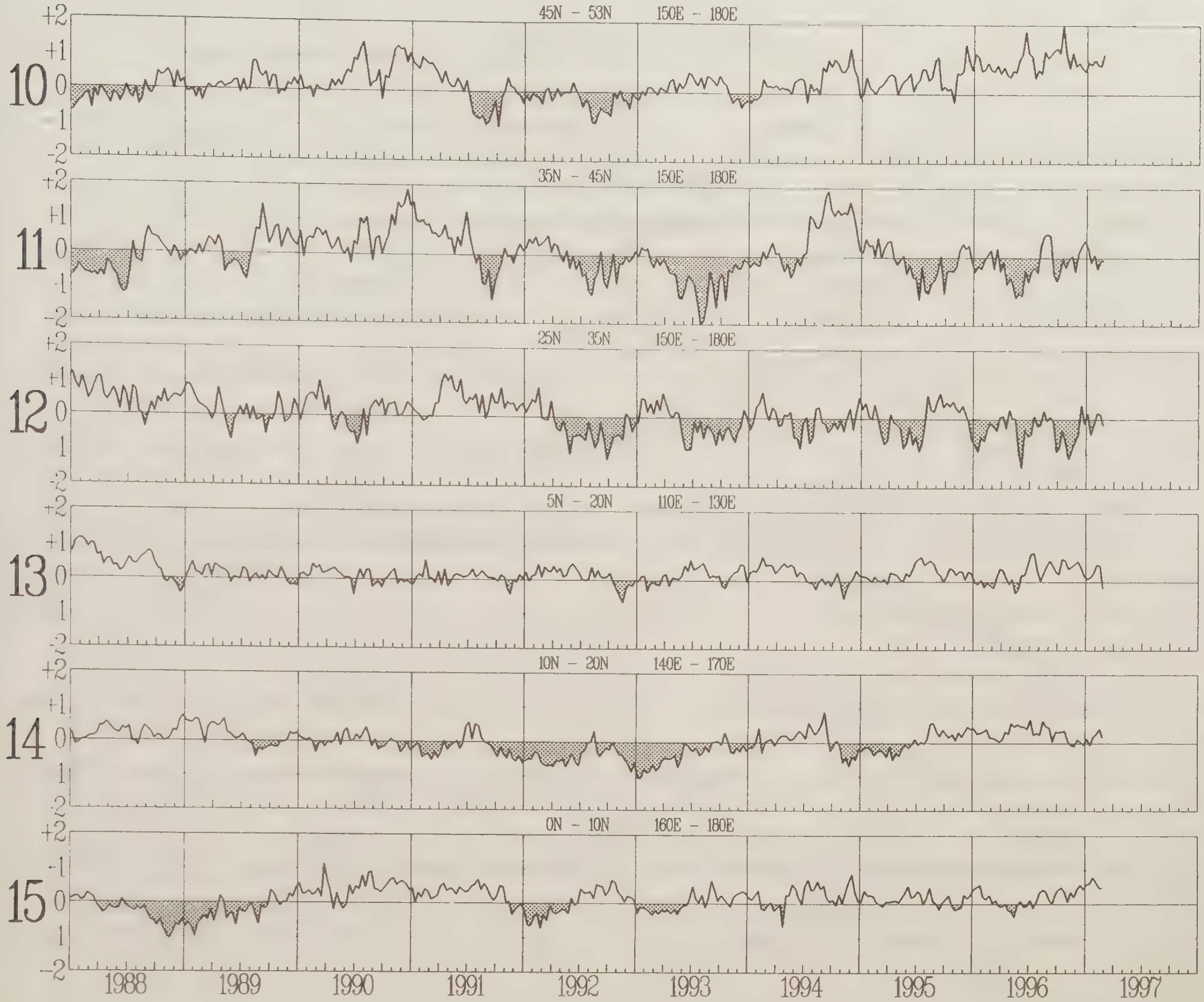


第12図　海域別旬平均海面水温平年偏差時系列図

Fig.12 Time series of the ten-day mean sea surface temperature anomalies (°C) in the western North Pacific for the areas shown in the right figure. Negative anomalies are shaded. Anomalies are computed from the JMA climatology (1961-90).

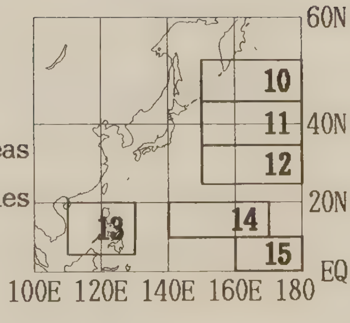


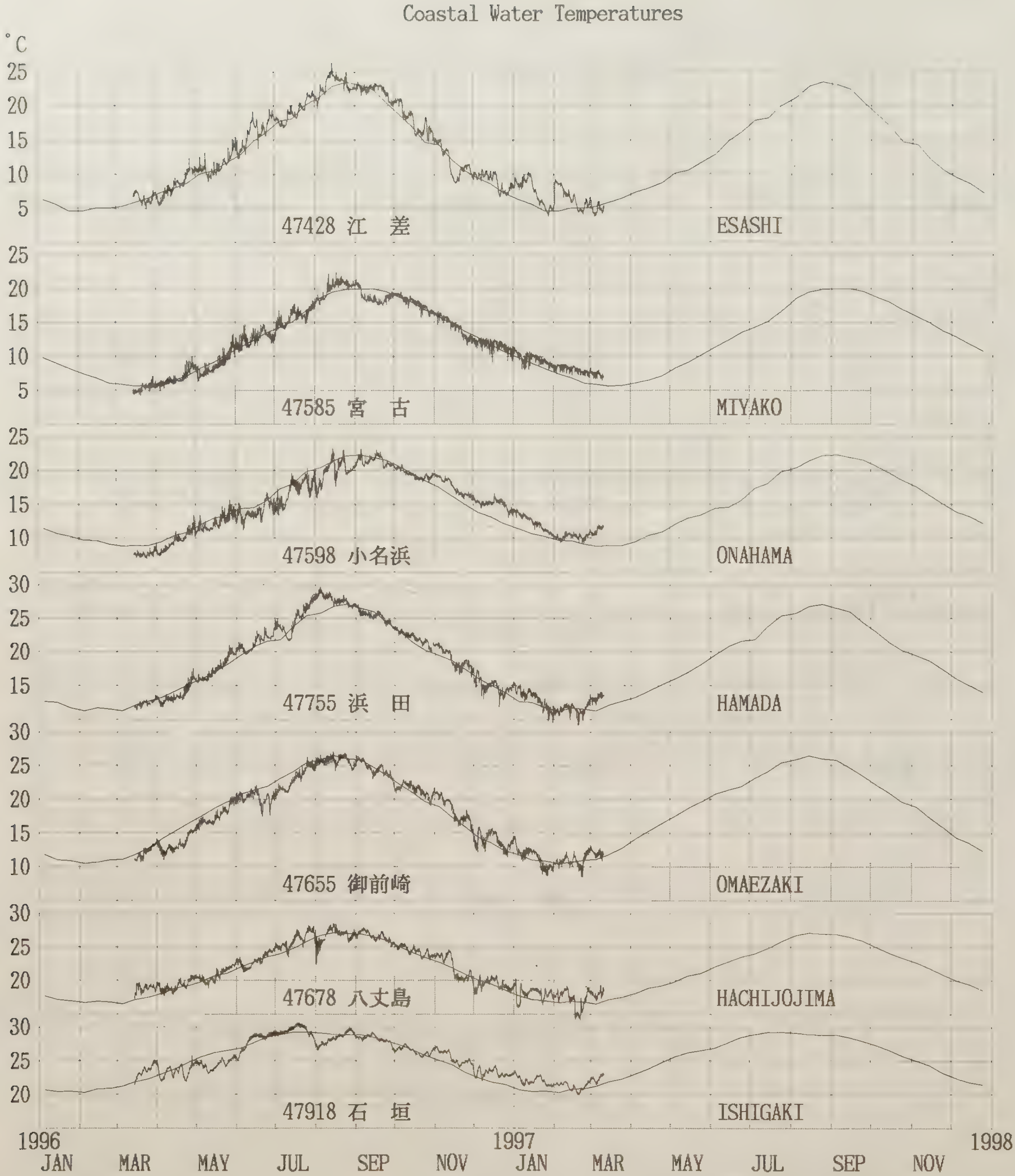
Time Series of Area Mean SST in the Western North Pacific



第12図　海域別旬平均海面水温平年偏差時系列図（つづき）

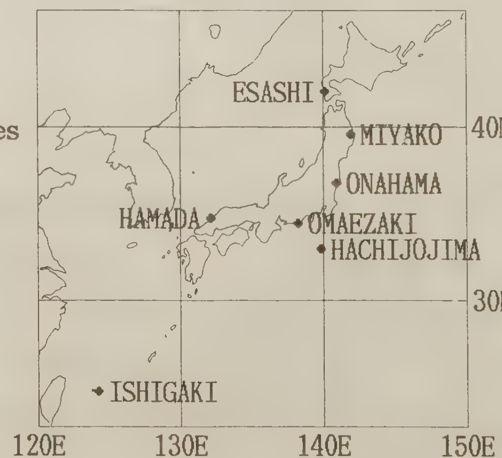
Fig.12 (continue) Time series of the ten-day mean sea surface temperature anomalies (°C) in the western North Pacific for the areas shown in the right figure. Negative anomalies are shaded. Anomalies are computed from the JMA climatology (1961-90).

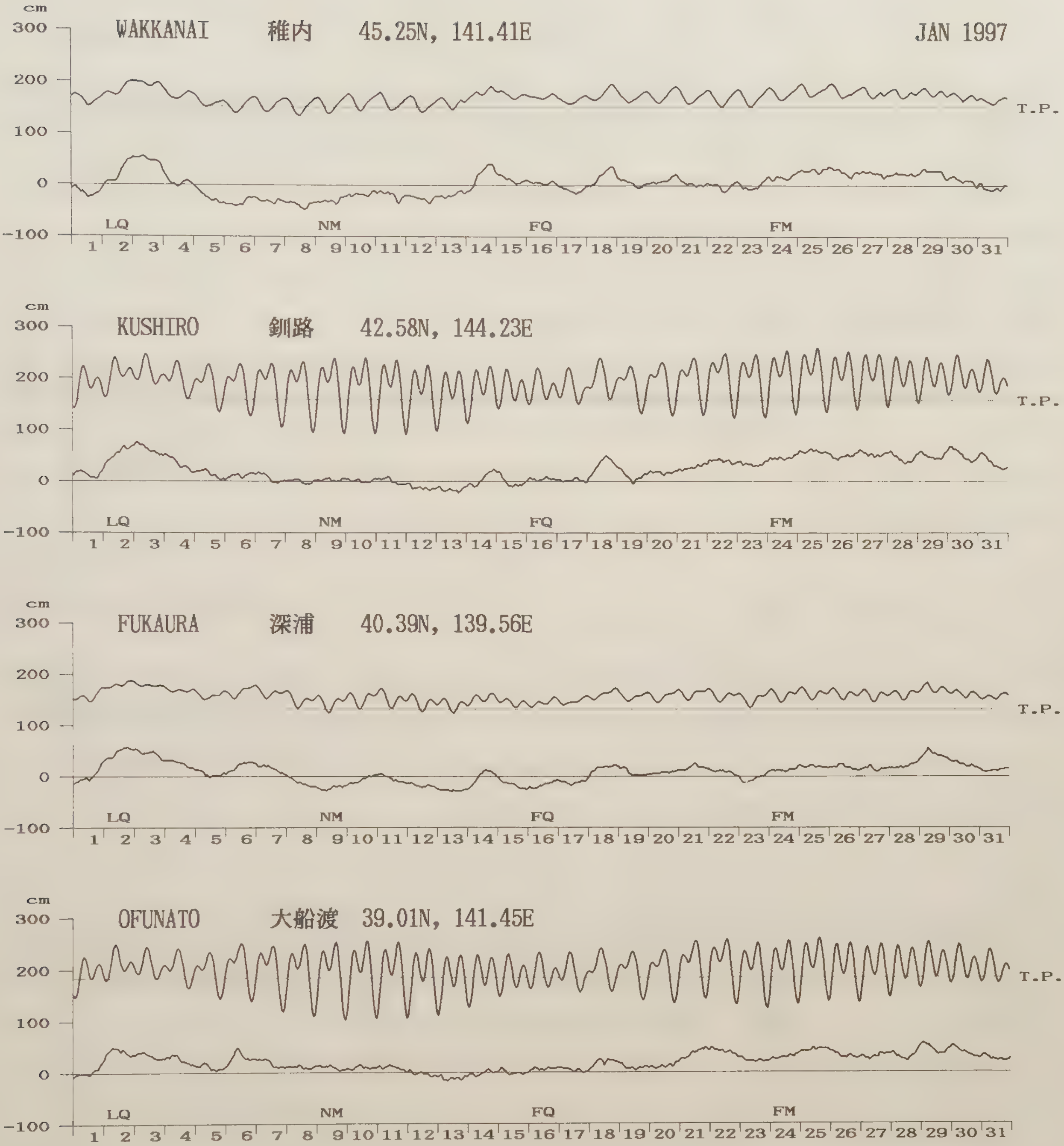




第13図 沿岸水温時系列図

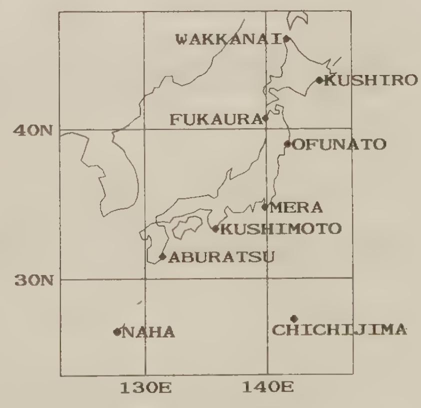
Fig.13 Time series of hourly coastal water temperatures (°C) measured at 7 coastal stations of the JMA shown in the right panel.
Thin lines show 10-day mean climatology.

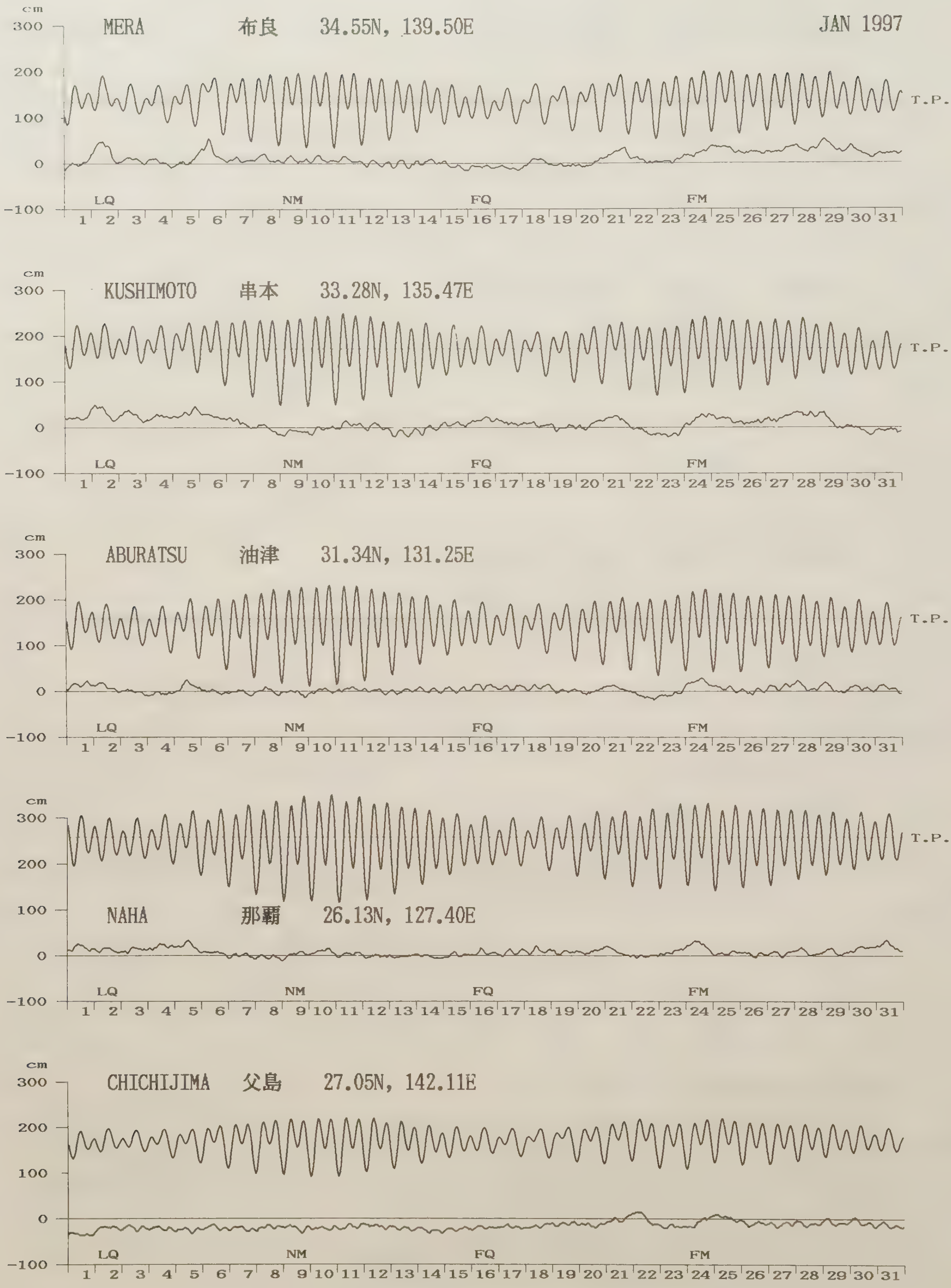




第14図 沿岸潮位時系列図（1997年 1月）

Fig.14 Time series of hourly sea level observation (upper line) and its anomalies (lower line) at 9 stations of the JMA in the right panel.
Short term variations are removed from raw data.
Sea level anomalies are two times values of the differences between the observations and the predicted astronominal tide.
FM: full moon, FQ: first quarter
NM: new moon, LQ: last quarter
T.P.: Mean sea level of Tokyo Bay (Tokyo Peil)

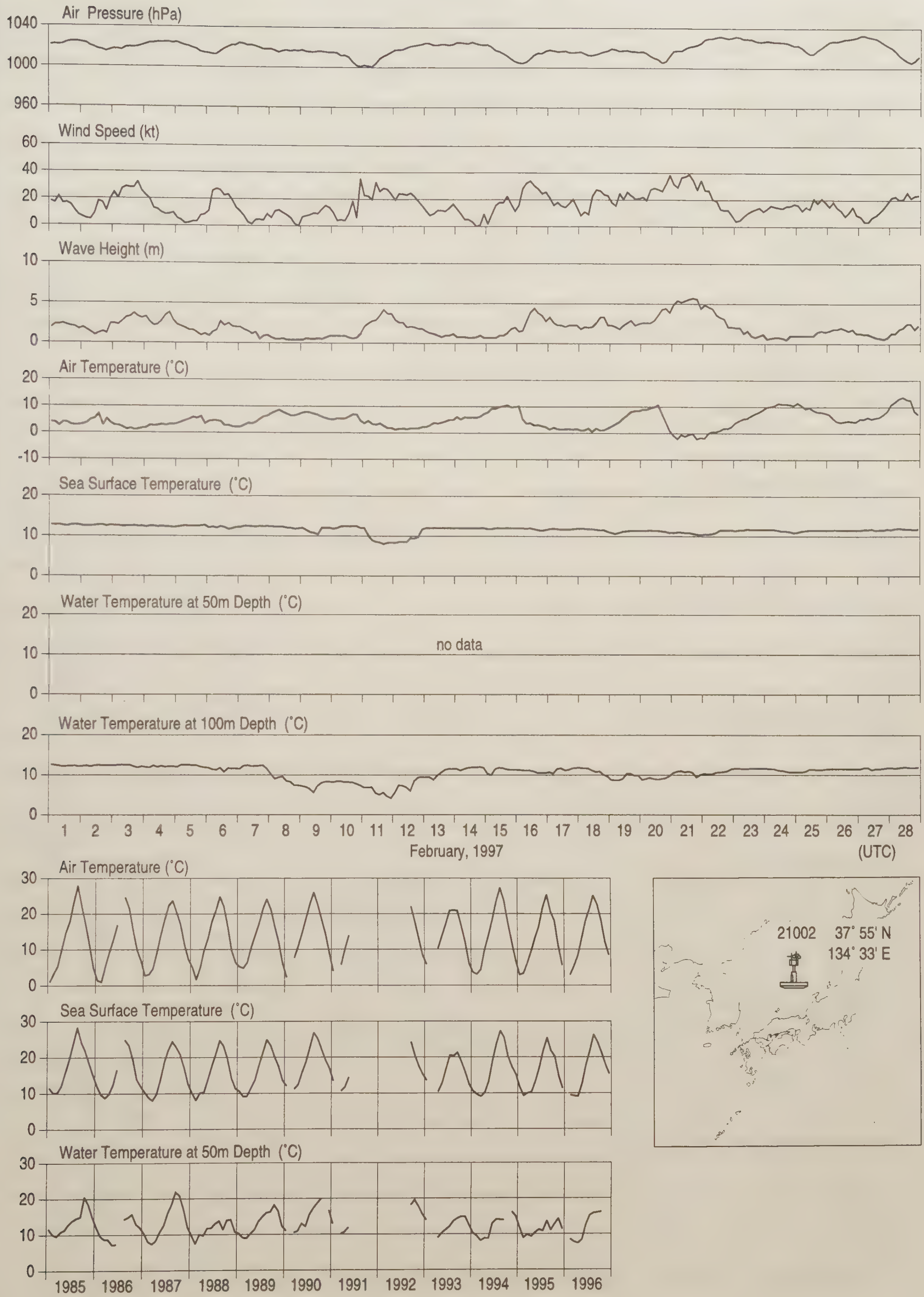




第14図 つづき

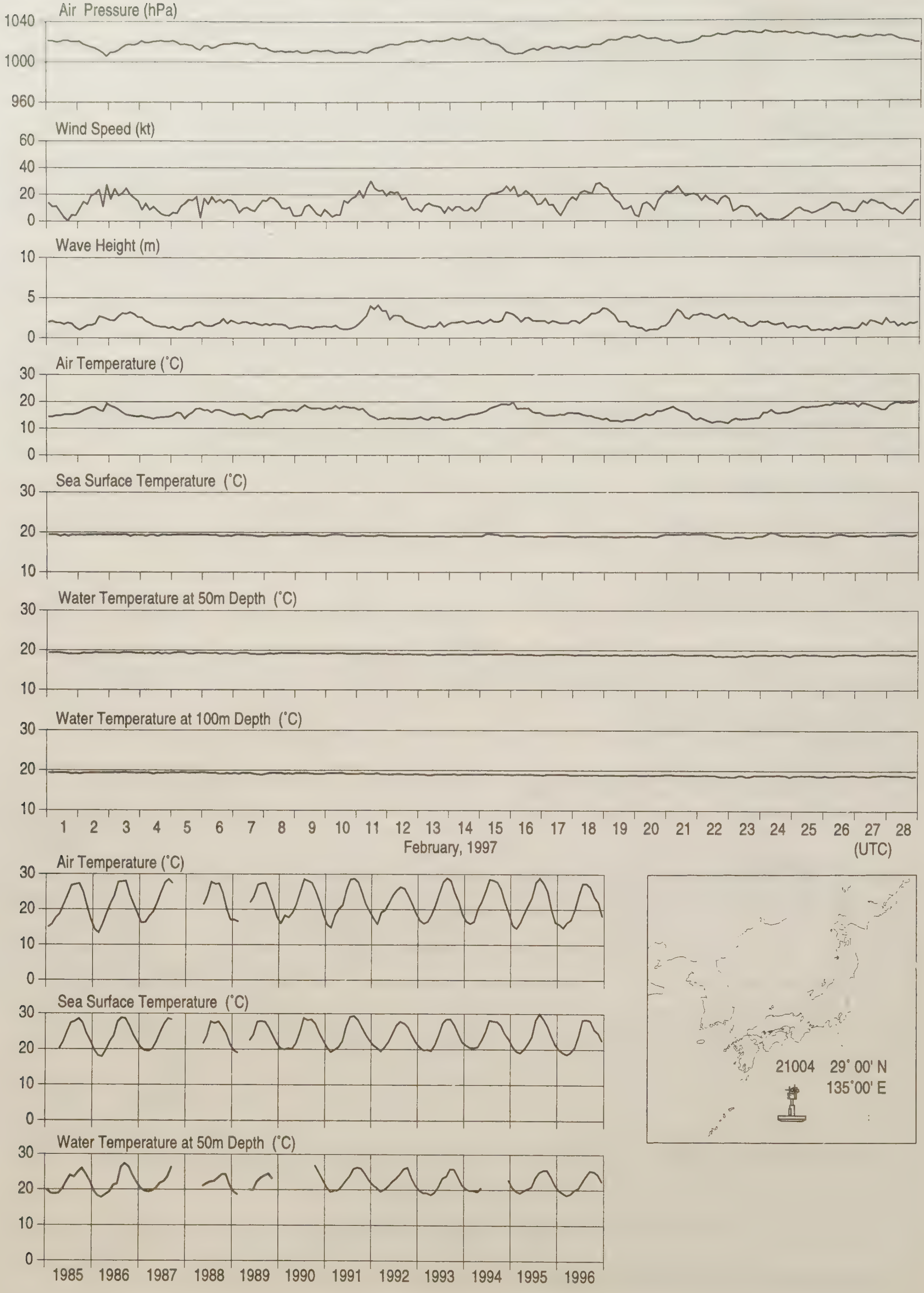
Fig.14 continue

Ocean Data Buoy Observations



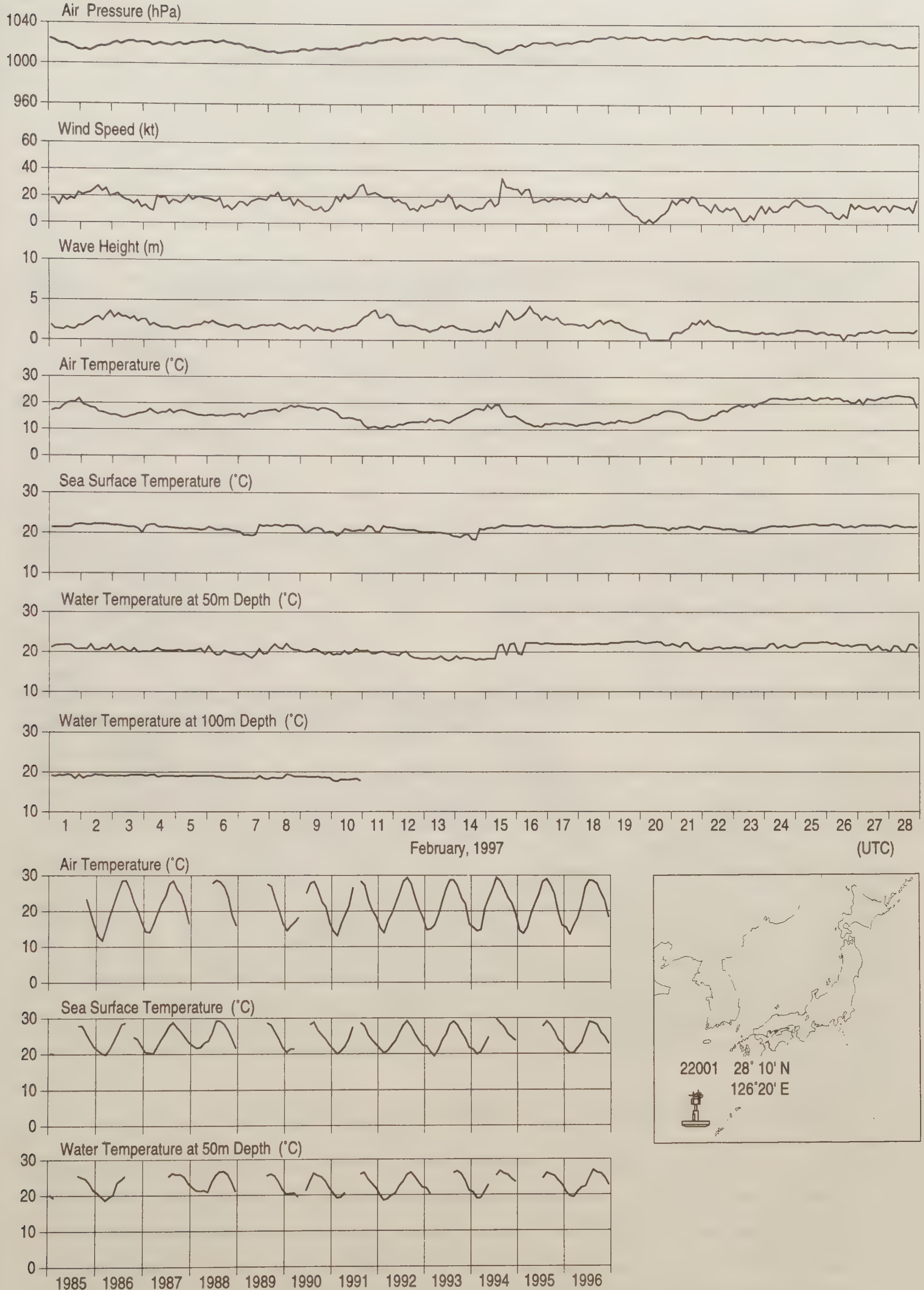
第15図　海洋気象ブイロボットによる観測の時系列図（日本海：21002）
上段は３時間毎の観測値を、下段は月平均値を示す。

Fig. 15　Time series of JMA buoy observation in the Japan Sea (WMO ID No.21002).
The upper panel shows three hourly observation and the lower panel shows the monthly mean data.



第15図　海洋気象ブイロボットによる観測の時系列図（四国沖：21004）
上段は３時間毎の観測値を、下段は月平均値を示す。

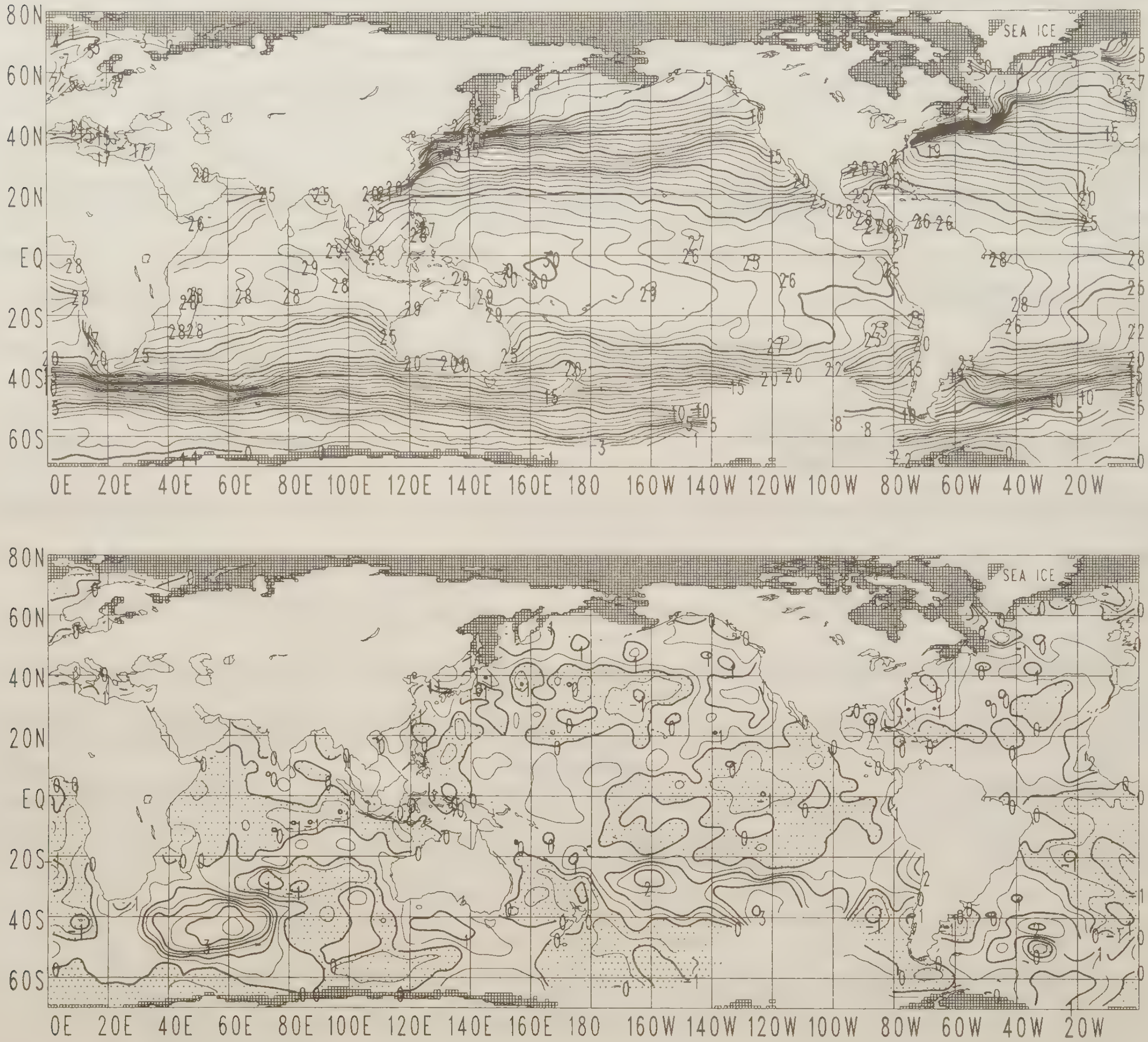
Fig. 15　Time series of JMA buoy observation south of Shikoku (WMO ID No.21004).
The upper panel shows three hourly observation and the lower panel shows the monthly mean data.



第15図　海洋気象ブイロボットによる観測の時系列図（東シナ海：22001）
上段は３時間毎の観測値を、下段は月平均値を示す。

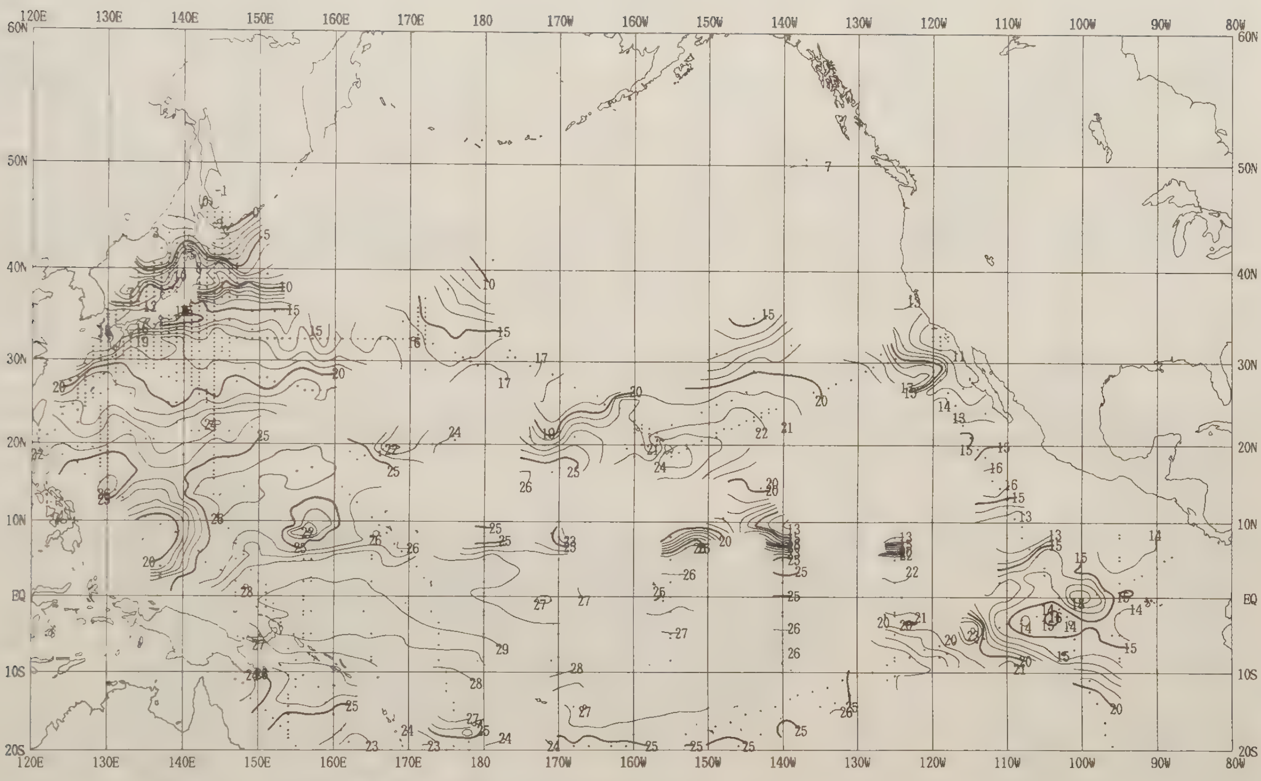
Fig. 15　Time series of JMA buoy observation in the East China Sea (WMO ID No.22001).
The upper panel shows three hourly observation and the lower panel shows the monthly mean data.

SST & Anomalies in the Global Ocean



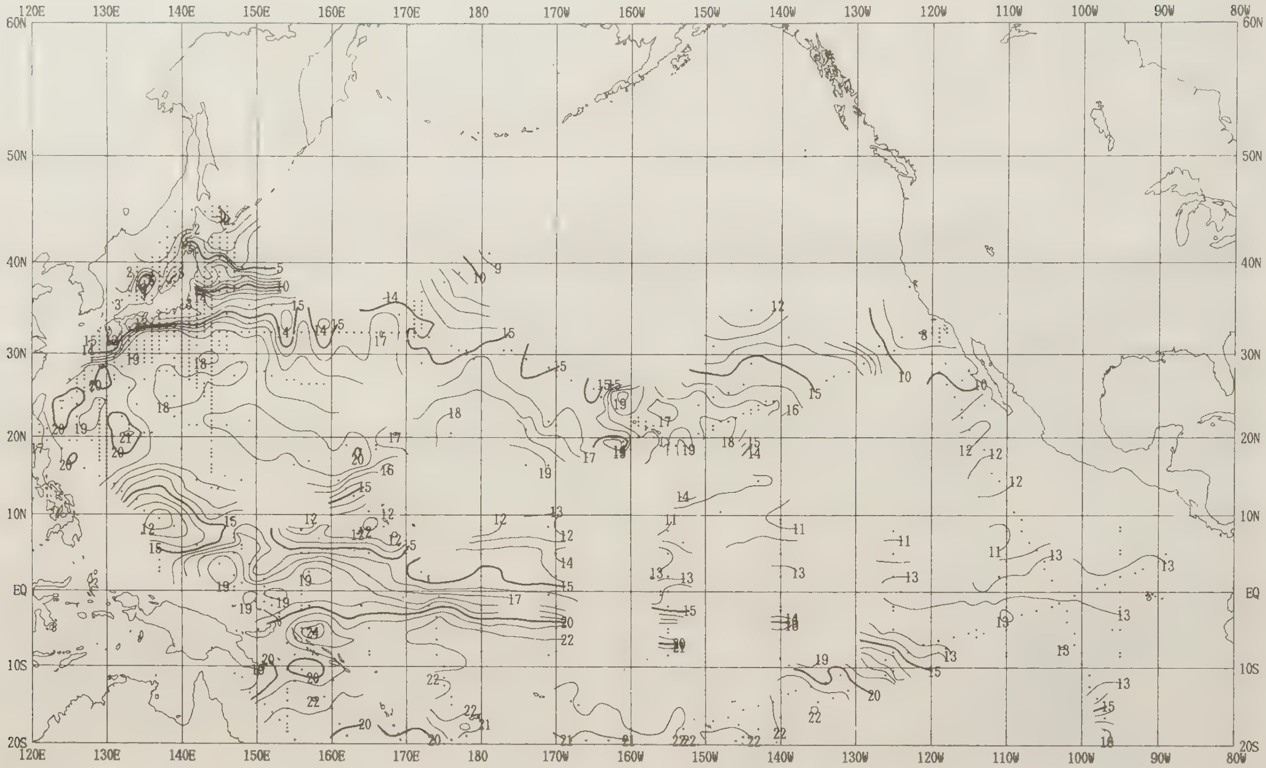
第16図　全球月平均海面水温図（上）及び偏差図（下）（1997年 2月）

Fig.16 Monthly mean sea surface temperature over the global ocean (top) and anomalies (bottom) for FEB 1997. Anomalies are computed from the JMA climatology (1961-1990) (Marine Department of JMA, 1991, Climatic charts of sea surface temperatures of the western North Pacific and the global ocean). Contour interval is 1°C (top) and additional anomaly contours of ±0.5°C are shown as thin lines. Negative anomalies are spotted. Maximum coverage of sea ice is shaded. Data sources for sea ice are U.S. National Ice Center (polar regions) and JMA (the Sea of Okhotsk).



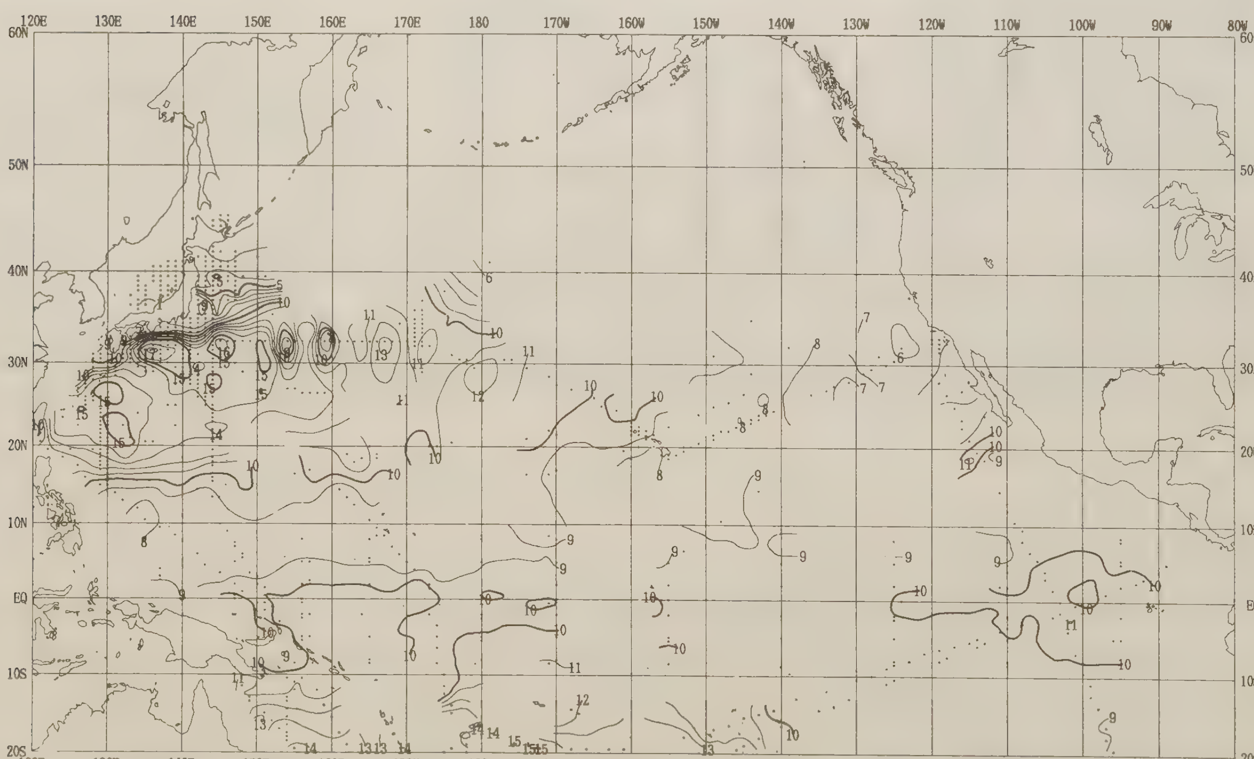
第17図　太平洋表層水温(深さ100m)図 (1997年 2月)

Fig.17 Subsurface (100m) temperatures in the Pacific Ocean for FEB 1997.
Contour interval is 1°C. Observation points are denoted by dots.



第18図　太平洋表層水温(深さ200m)図 (1997年 2月)

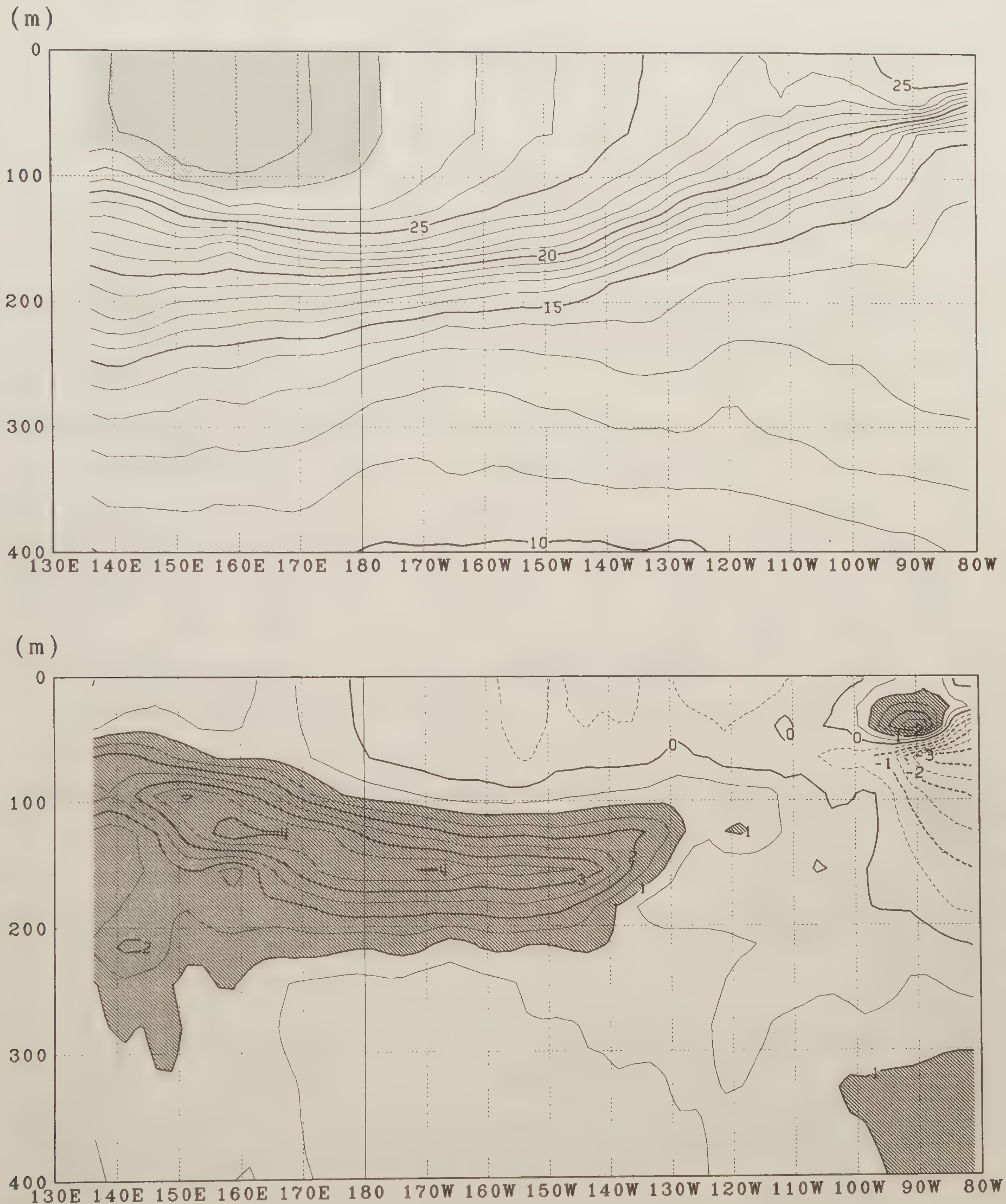
Fig.18 Subsurface (200m) temperatures in the Pacific Ocean for FEB 1997.
Contour interval is 1°C. Observation points are denoted by dots.



第19図　太平洋表層水温(深さ400m)図 (1997年 2月)

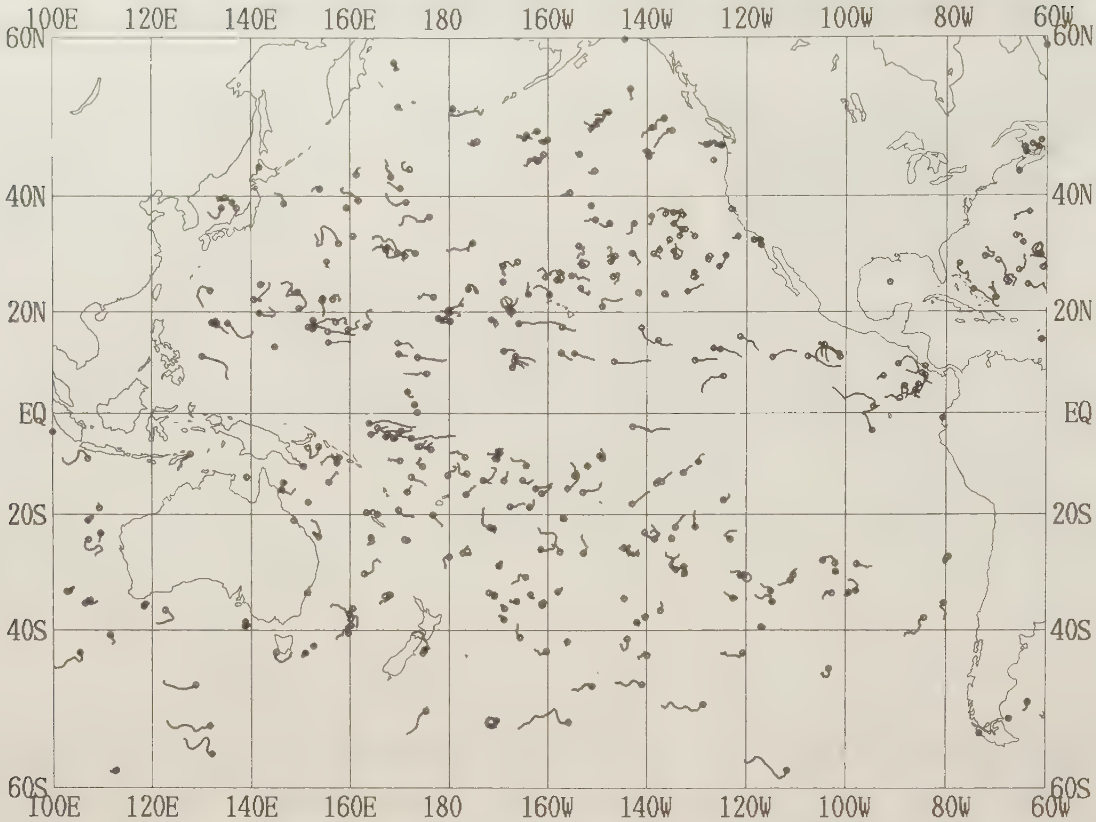
Fig.19 Subsurface (400m) temperatures in the Pacific Ocean for FEB 1997.
Contour interval is 1°C. Observation points are denoted by dots.

Depth-Longitude Sections of Equatorial Temperature & Anomalies



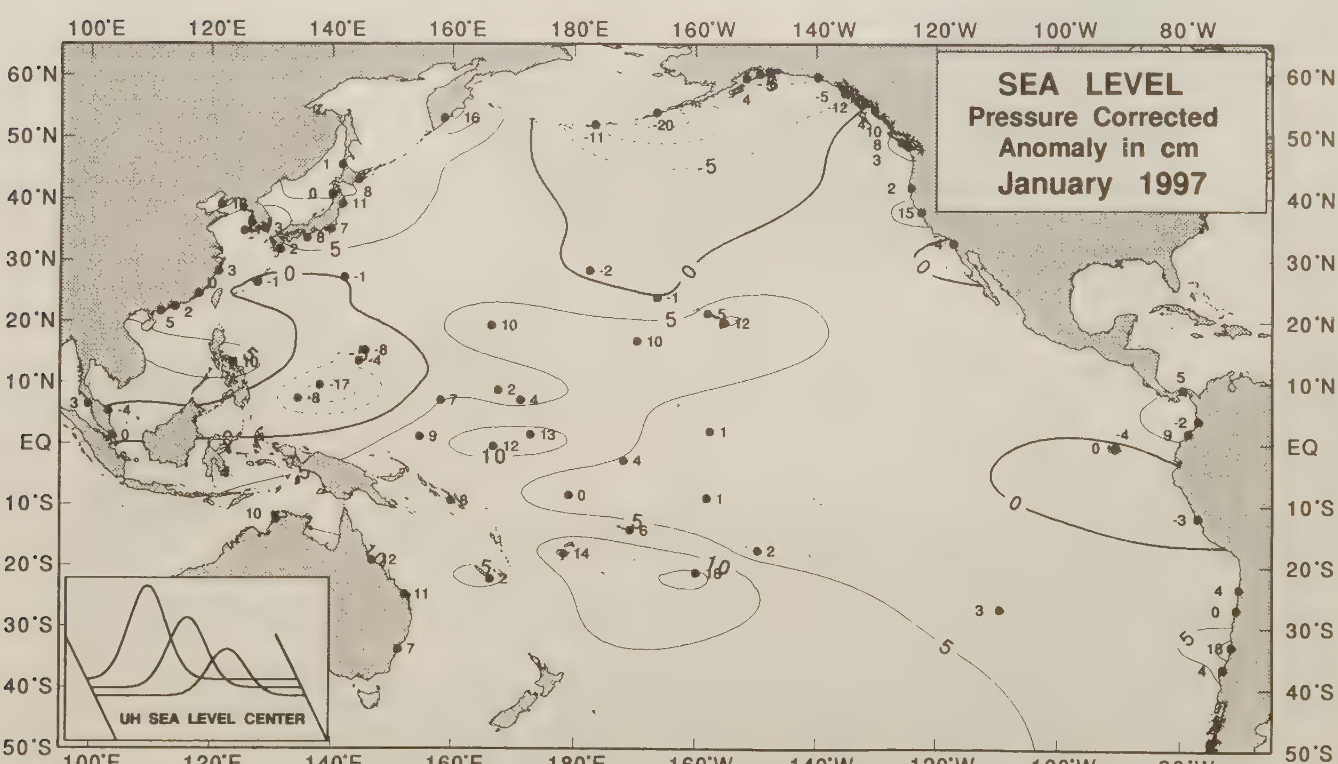
第20図　太平洋赤道に沿う表層水温（上）及び偏差（下）の深度－経度断面図（1997年 2月）

Fig.20 Depth-longitude sections of temperature (top) and anomalies (bottom) along the equator in the Pacific Ocean for FEB 1997. Data are derived from the Ocean Data Assimilation System of JMA. Contour interval is 1°C (top) and 0.5°C (bottom). Values greater than 28°C in top panel are shaded. In bottom panel values greater than 1°C are shaded and values less than -1°C are spotted. Anomalies are computed from 1987-1995 base period means.



第21図　太平洋ブイ流跡図(1997年 2月)

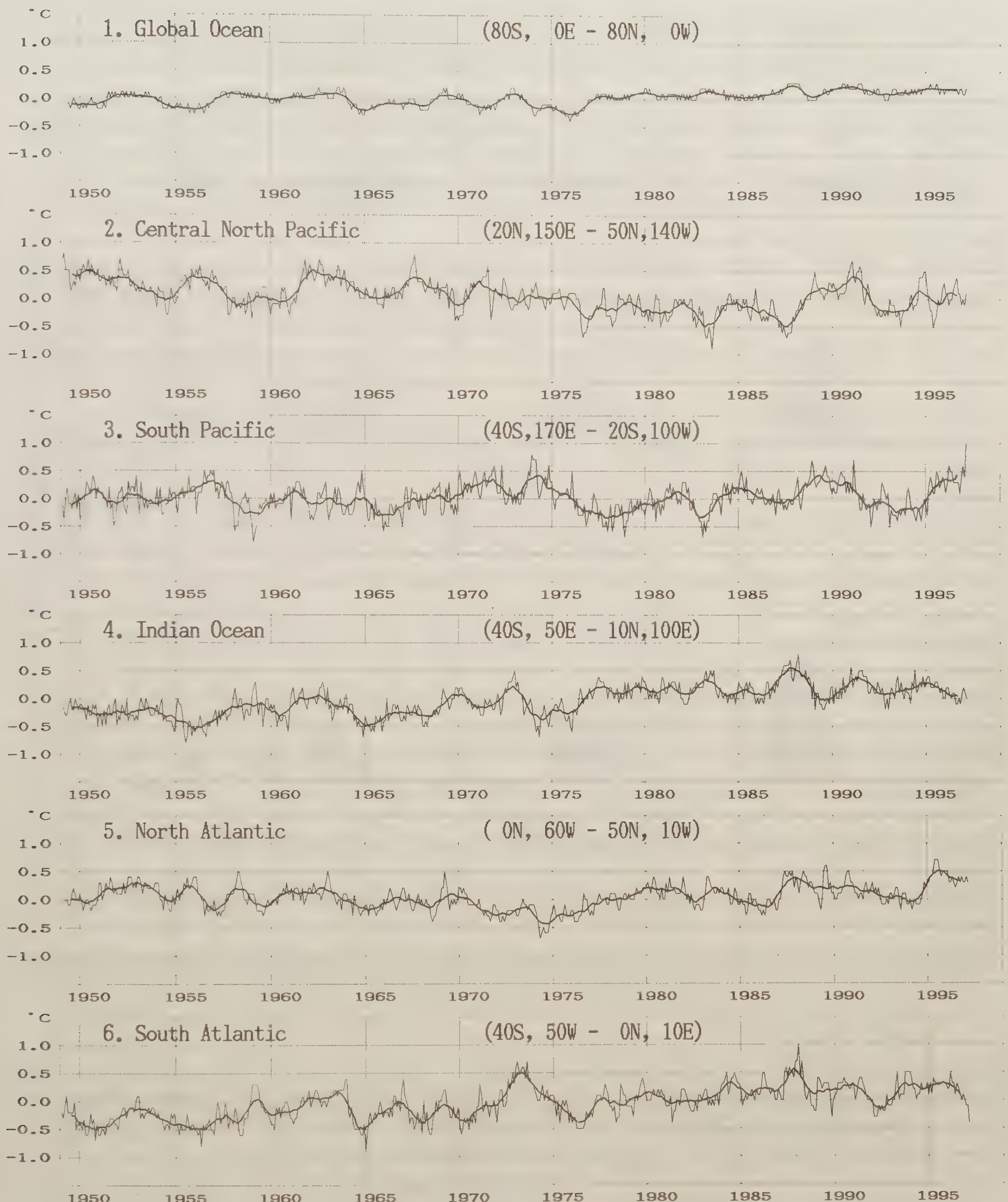
Fig.21 Movements of drifting buoys in the Pacific Ocean during FEB 1997.
Each track is for one buoy. Small circles represent last positions for the month.



第22図　太平洋海面水位偏差図 (1997年 1月)

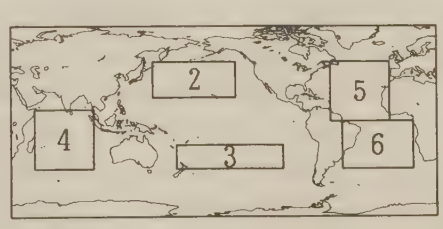
Fig.22 Monthly sea level anomalies for JAN 1997 obtained from mean sea level (1975-1986) adjusted for atmospheric pressure. This figure is prepared by the SOC of ISLP-PAC, Dept. of Oceanography, Univ. of Hawaii.

Long-term Variation of Monthly Mean SST Anomalies

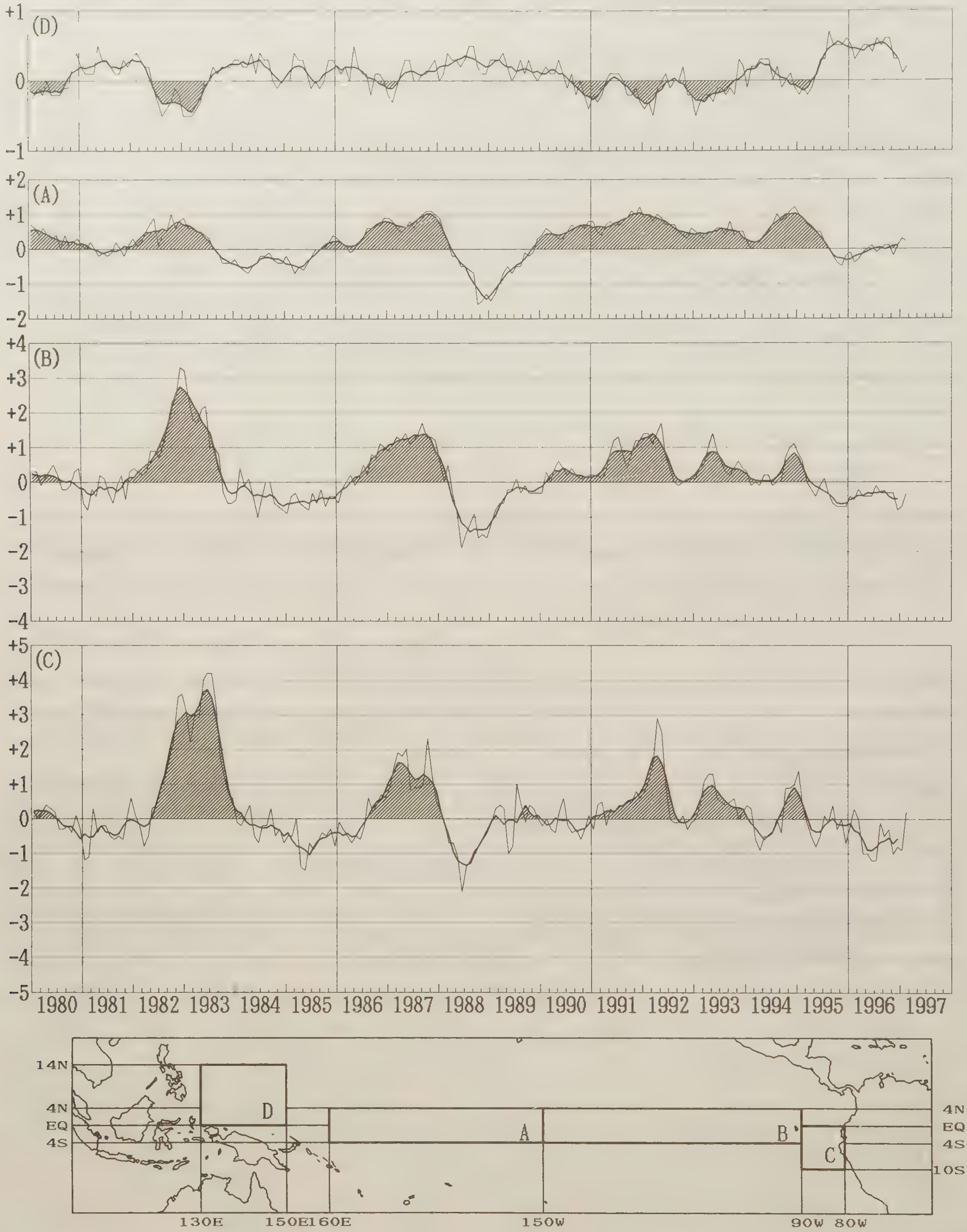


第23図 海域平均海面水温偏差の長期変動

Fig.23 Long-term variations of monthly mean sea surface temperature anomalies (°C) for the areas shown in the right panel. Anomalies are computed from the JMA climatology (1961-90). Thin lines show the monthly mean and thick lines their 13-month running means.



Time Series of Equatorial Pacific SST Anomalies

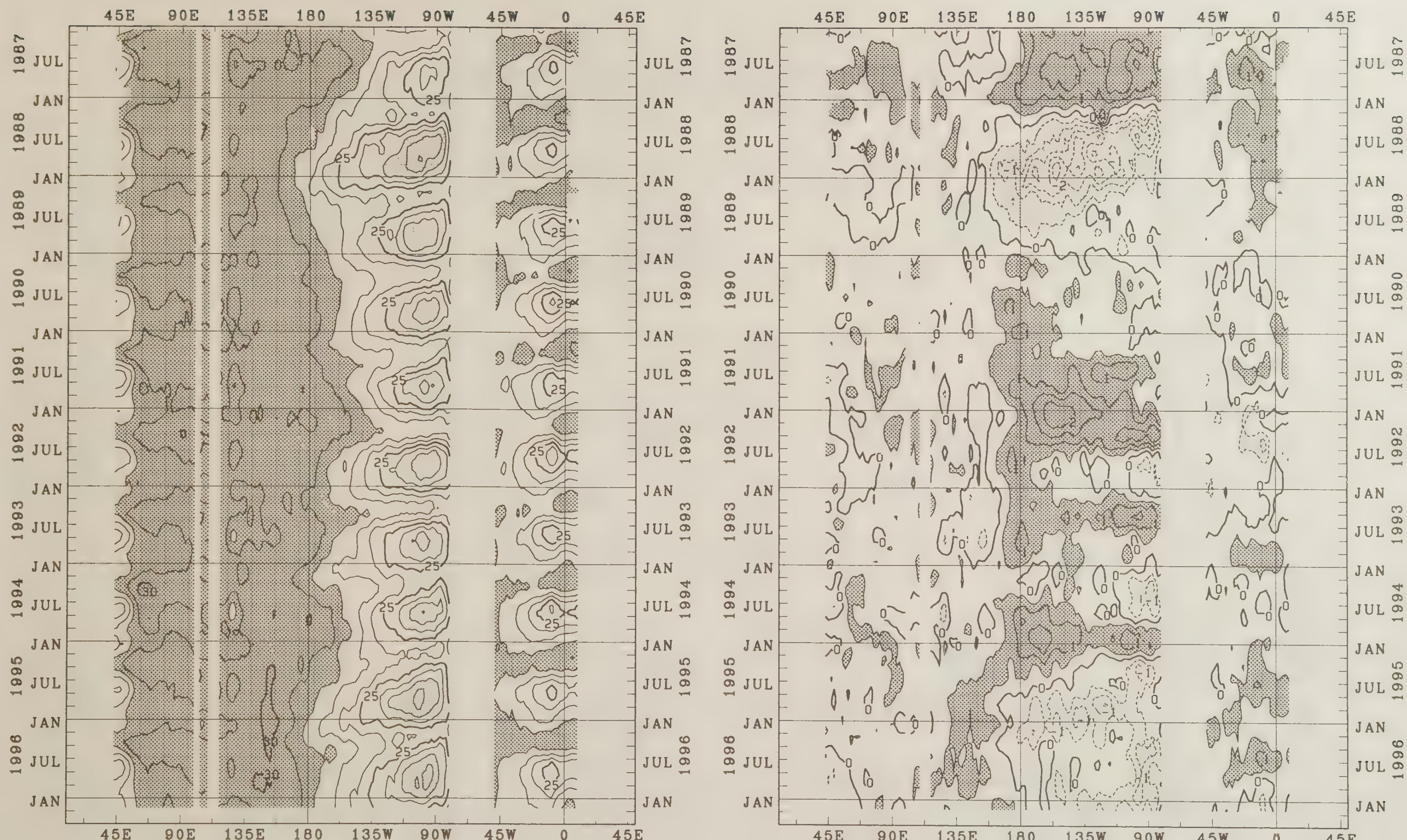


第24図　太平洋赤道域の海面水温偏差時系列図
Fig.24 Time series of monthly mean SST anomalies (°C) in the equatorial Pacific Ocean for the areas indicated at the bottom.
Thin lines show the monthly means and thick lines their 5-month running means. Positive anomalies (A, B, C) and negative anomalies (D) are shaded. Anomalies are computed from the JMA climatology (1961-1990).

	SEA SURFACE TEMPERATURE AND ANOMALY (°C)								SOI	SEA LEVEL PRESSURE ANOMALY (hPa)	
MONTH	REGION D 14N-EQ 130E-150E		REGION A 4N-4S 160E-150W		REGION B 4N-4S 150W-90W		REGION C EQ-10S 90W-80W		SOI	TAHITI 17-33S 149-37W	DARWIN 12-24S 130-52E
JAN 95	28.3	-0.2	29.0	1.0	26.2	0.8	25.7	1.4	-0.4	-0.3	0.6
FEB 95	28.2	-0.1	28.9	0.9	26.8	0.6	26.1	0.4	-0.2	0.6	1.1
MAR 95	28.2	-0.2	28.8	0.7	26.9	0.0	25.8	-0.1	0.4	0.3	-0.5
APR 95	28.7	-0.1	28.8	0.6	26.9	-0.2	24.6	-0.5	-1.4	-1.6	-0.0
MAY 95	29.2	0.1	29.0	0.5	26.2	-0.4	23.1	-0.8	-1.1	-0.7	0.6
JUN 95	29.6	0.3	29.0	0.5	26.0	-0.1	22.2	-0.5	-0.1	0.3	0.4
JUL 95	29.5	0.3	28.7	0.2	25.3	0.1	21.7	0.1	0.4	0.4	-0.4
AUG 95	29.8	0.7	28.4	0.0	24.3	-0.3	20.5	-0.1	0.0	0.4	0.3
SEP 95	29.7	0.5	28.1	-0.2	24.0	-0.6	20.7	0.4	0.2	0.4	-0.0
OCT 95	29.8	0.5	28.0	-0.4	23.9	-0.7	20.4	-0.3	-0.3	-0.7	-0.5
NOV 95	29.7	0.5	27.9	-0.5	23.9	-0.7	21.5	0.0	0.1	0.1	-0.1
DEC 95	29.5	0.6	28.0	-0.2	24.2	-0.7	21.9	-0.7	-0.5	-0.9	0.0
JAN 96	29.0	0.5	27.9	-0.1	25.0	-0.4	24.1	-0.2	0.8	1.0	-0.7
FEB 96	28.6	0.3	27.6	-0.4	25.7	-0.5	26.0	0.3	0.1	-0.3	-0.5
MAR 96	28.8	0.4	27.8	-0.3	26.7	-0.2	25.9	0.0	0.7	1.0	-0.3
APR 96	29.3	0.5	28.1	-0.1	26.7	-0.4	24.1	-1.0	0.8	0.5	-0.5
MAY 96	29.6	0.5	28.5	0.0	26.2	-0.4	22.9	-1.0	0.3	1.2	1.2
JUN 96	29.7	0.4	28.6	0.1	25.7	-0.4	21.5	-1.2	1.4	1.6	-0.2
JUL 96	29.8	0.6	28.4	-0.1	25.1	-0.1	20.4	-1.2	0.7	0.6	-0.6
AUG 96	29.6	0.5	28.4	0.0	24.3	-0.3	20.5	-0.1	0.4	0.4	-0.3
SEP 96	29.8	0.6	28.4	0.1	24.3	-0.3	19.8	-0.5	0.5	-0.7	-1.7
OCT 96	29.9	0.6	28.5	0.1	24.3	-0.3	20.4	-0.3	0.4	-0.1	-0.8
NOV 96	29.5	0.3	28.2	-0.2	24.3	-0.3	20.5	-1.0	-0.0	-0.5	-0.5
DEC 96	29.2	0.3	28.3	0.1	24.1	-0.8	21.8	-0.8	0.8	-0.3	-1.9
JAN 97	28.6	0.1	28.3	0.3	24.7	-0.7	23.4	-0.9	0.3	1.7	0.9
FEB 97	28.5	0.2	28.2	0.2	25.9	-0.3	25.9	0.2	1.2	1.0	-1.9

第1表　エルニーニョ監視指数

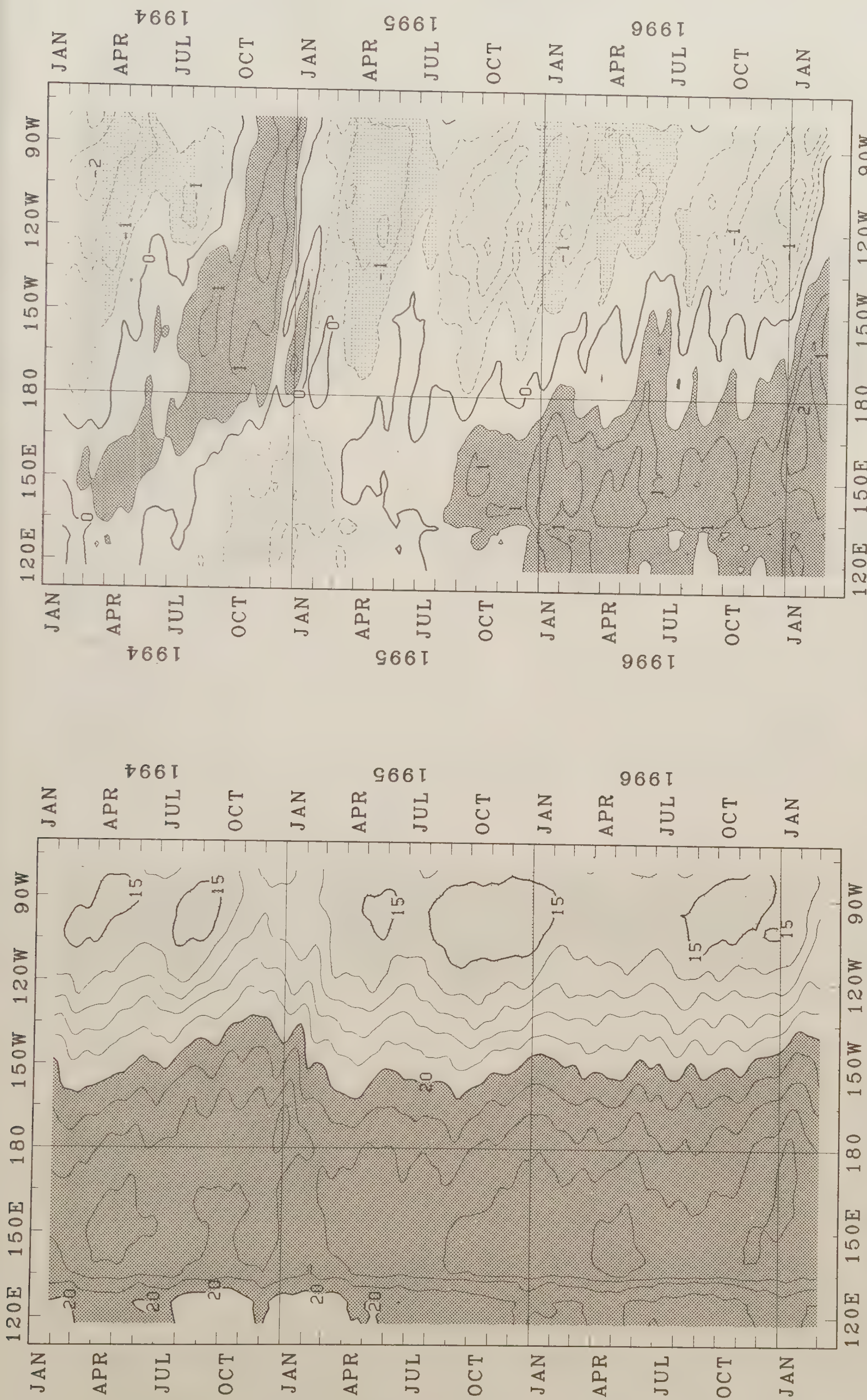
Table 1 El Nino Monitoring indices



第 25 図 赤道に沿った海面水温（左）および偏差（右）の時間-経度断面図

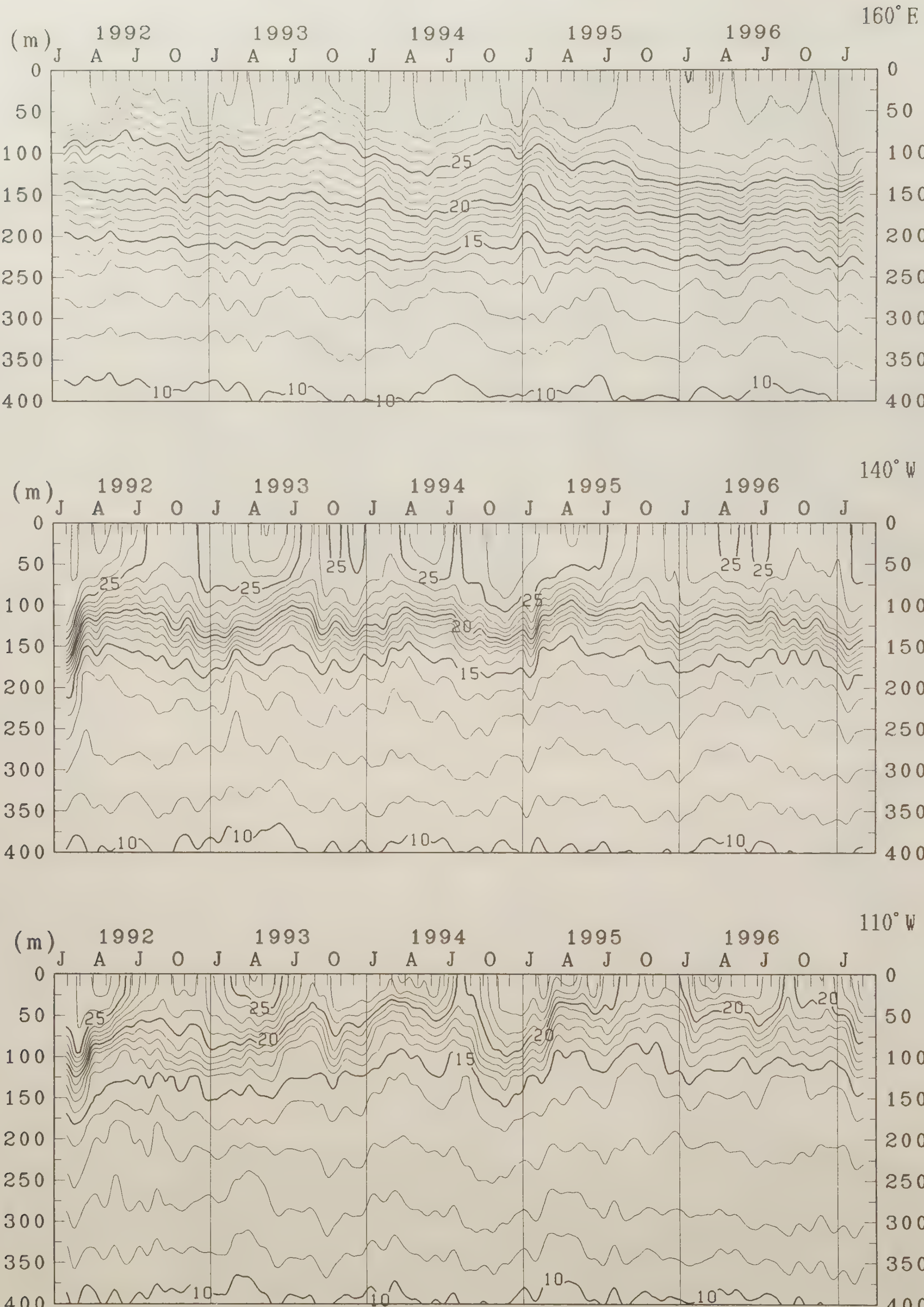
Fig.25 Time-longitude sections of SSTs (left) and anomalies (right) along the equator (2 °N-2 °S) in the global ocean. Contour interval is 1 °C (left) and 0.5 °C (right). Values in the left panel greater than 28 °C are shaded and values less than 23 °C are spotted. Dashed contours in right panel indicate negative anomalies. Anomalies are computed from 1961-1990 base period means.

Time-Longitude Sections of Ocean Heat Content & Anomalies (Eq.)



第26図　太平洋の赤道に沿う海洋表層の貯熱量（左）及び偏差（右）の時間－経度断面図

Fig.26 Time-longitude sections of ocean heat content in the upper 260m along the equator (left) and anomalies (right) in the Pacific Ocean. Data are derived from the Ocean Data Assimilation System of JMA. Contour interval is 1°C (left) and 0.5°C (right). Values in the left panel greater than 20°C are shaded and values less than 16°C are spotted. Dashed contours in right panel indicate negative anomalies. Anomalies are computed from 1987-1995 base period means.



第27図　太平洋赤道域の表層水温の時間－深度断面図

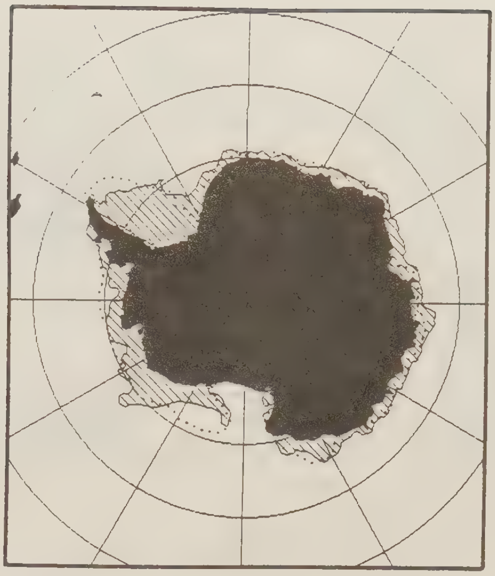
（上：西部、中：中部、下：東部）

Fig.27 Time-depth sections of equatorial subsurface temperature for the western Pacific (top, 160°E), the central Pacific (middle, 140°W) and the eastern Pacific (bottom, 110°W). Data are derived from the Ocean Data Assimilation System of JMA. Contour interval is 1°C. Values greater than 28°C are shaded.



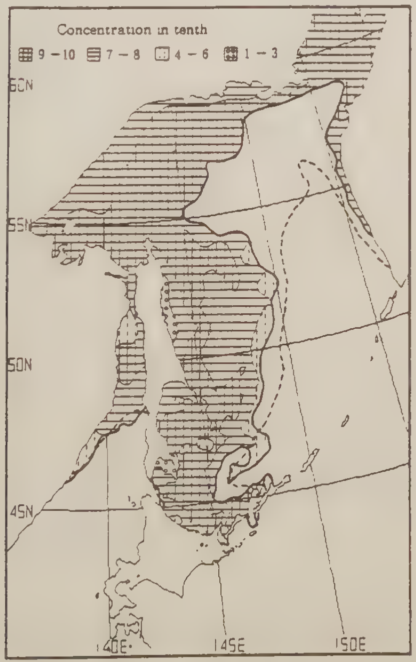
第28-1図　北極域の海氷図（1997年 2月14日）

Fig. 28-1 Sea ice chart in the Arctic on 14 FEB 1997. The area hatched represents the sea ice extent. The dotted line denotes the mean ice edge (averaged for the period from 1972 through 1990). The data source is the U.S. National Ice Center (USA).



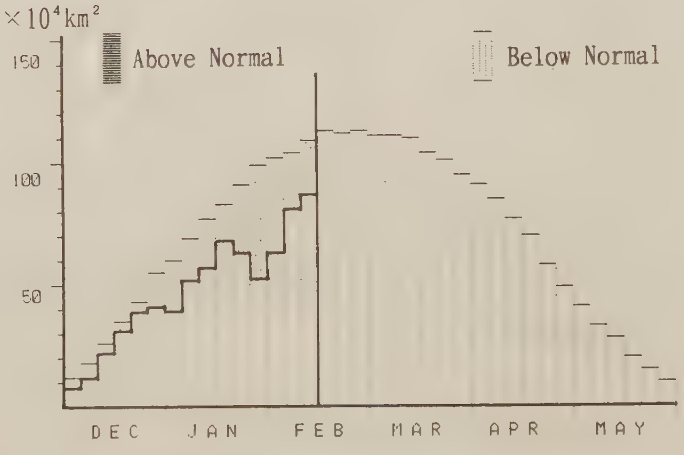
第28-2図　南極域の海氷図（1997年 2月14日）

Fig. 28-2 Sea ice chart in the Antarctic on 14 FEB 1997. The area hatched represents the sea ice extent. The dotted line denotes the mean ice edge (averaged for the period from 1972 through 1990). The data source is the U.S. National Ice Center (USA).



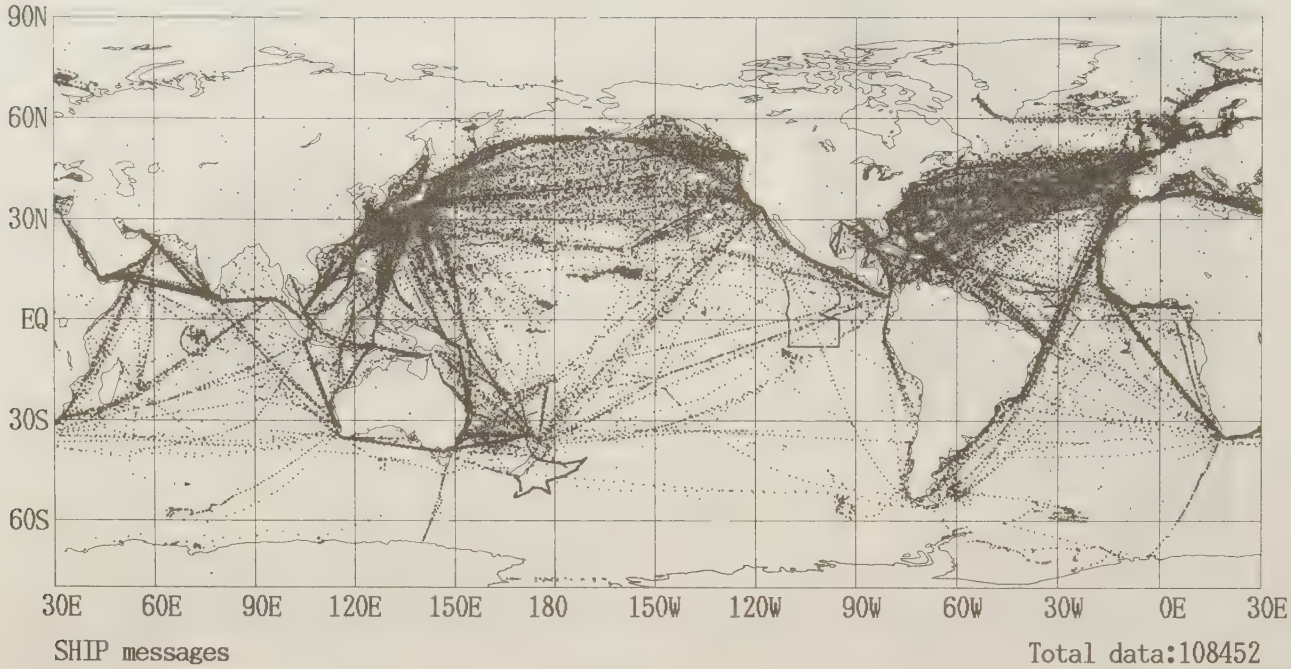
第28-3図　オホーツク海の海氷図（1997年 2月15日）

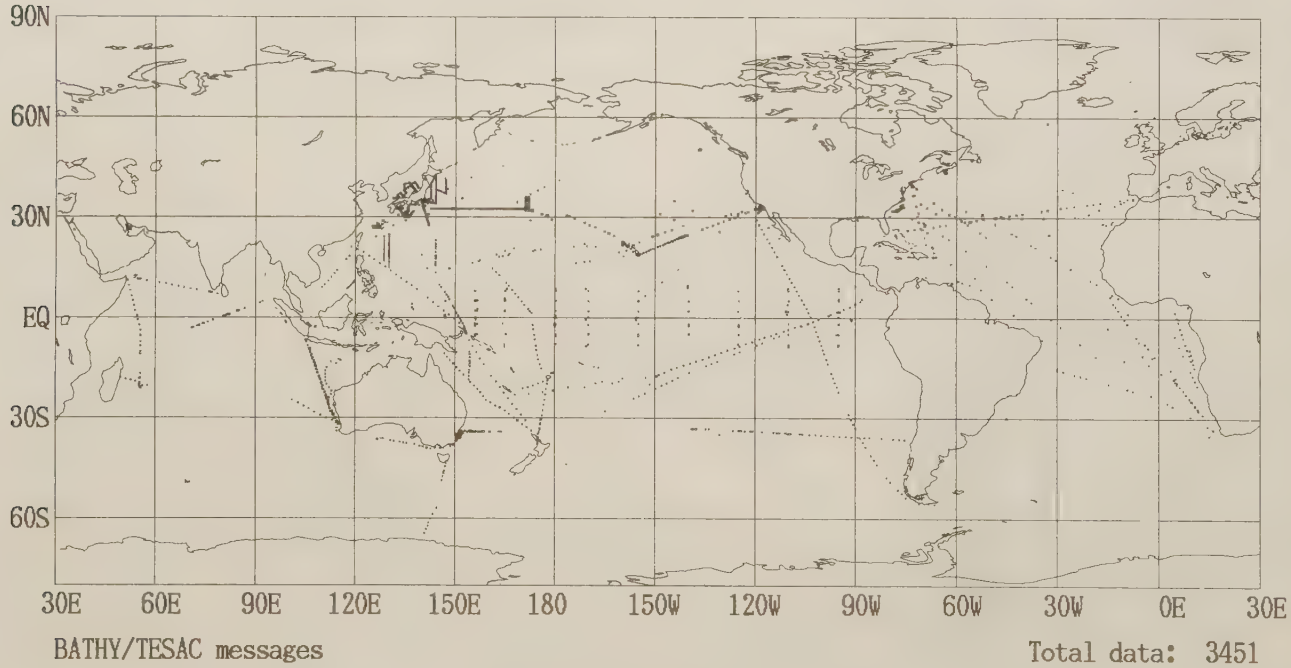
Fig. 28-3 Sea ice chart in the Sea of Okhotsk on 15 FEB 1997. The dotted line denotes mean ice edge (averaged for the period from 1972 through 1990).



第28-4図　オホーツク海半旬海氷域面積（1996/97）

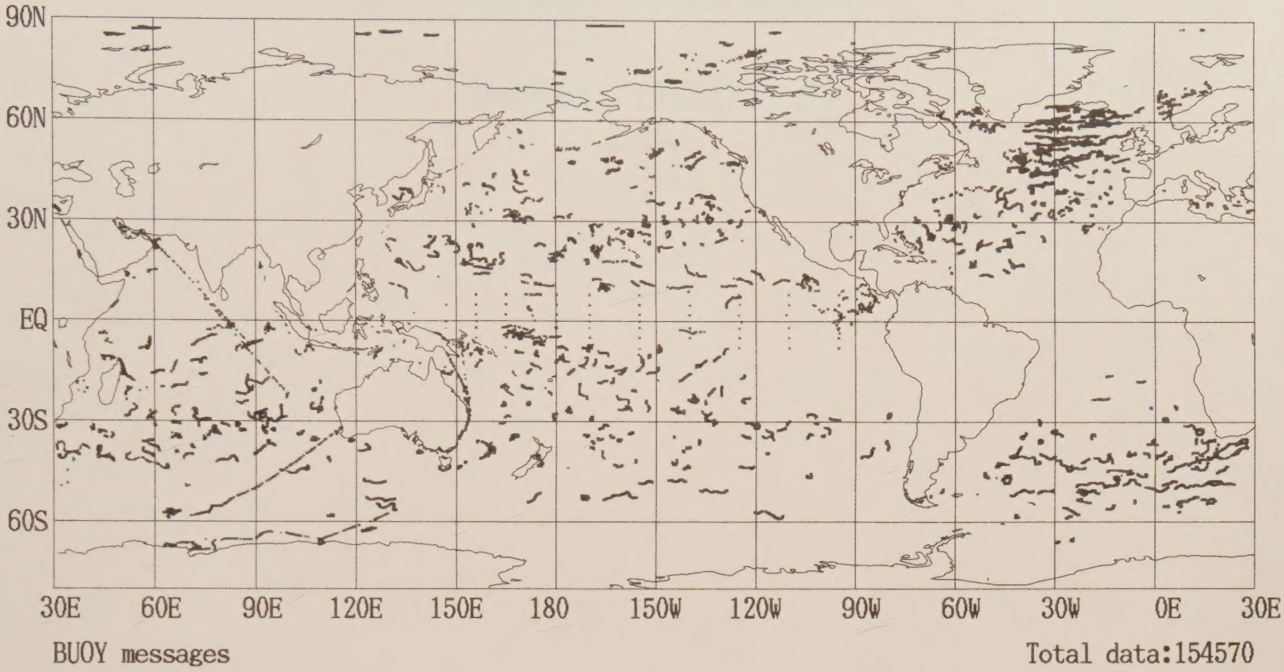
Fig. 28-4 Time-series of 5-day sea ice extent in the Sea of Okhotsk (1996/97).

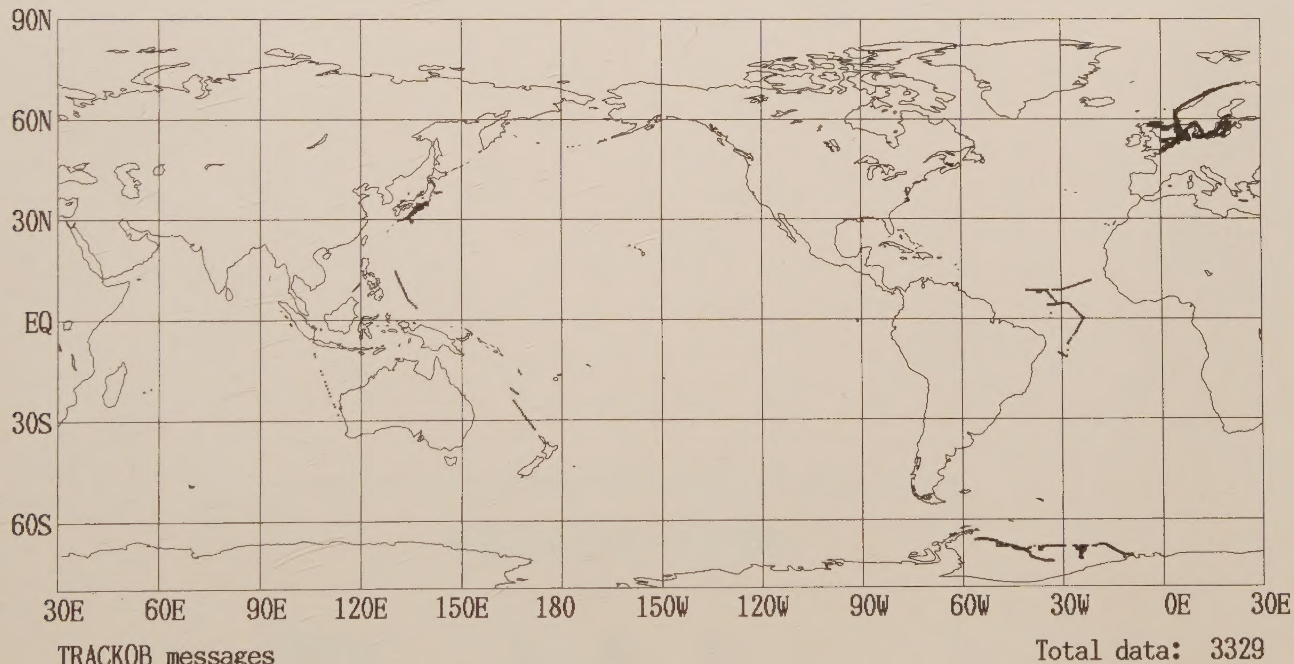




第29-1図　測点分布図(1997年 2月)

Fig.29-1 Geographical distribution of SHIP messages (SST data, top) and BATHY/TESAC messages (subsurface temperature data, bottom) for FEB 1997.





第29-2図　測点分布図(1997年 2月)

Fig.29-2 Geographical distribution of BUOY messages (buoy drift and SST data, top) and TRACKOB messages (ship drift and SST data, bottom) for FEB 1997.

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